Unified Enantioselective, Convergent Synthetic Approach Toward the Furanobutenolide-Derived Polycyclic Norcembranoid Diterpenes: Synthesis of a Series of Ineleganoloids by Oxidation State Manipulation of the Carbocyclic Core

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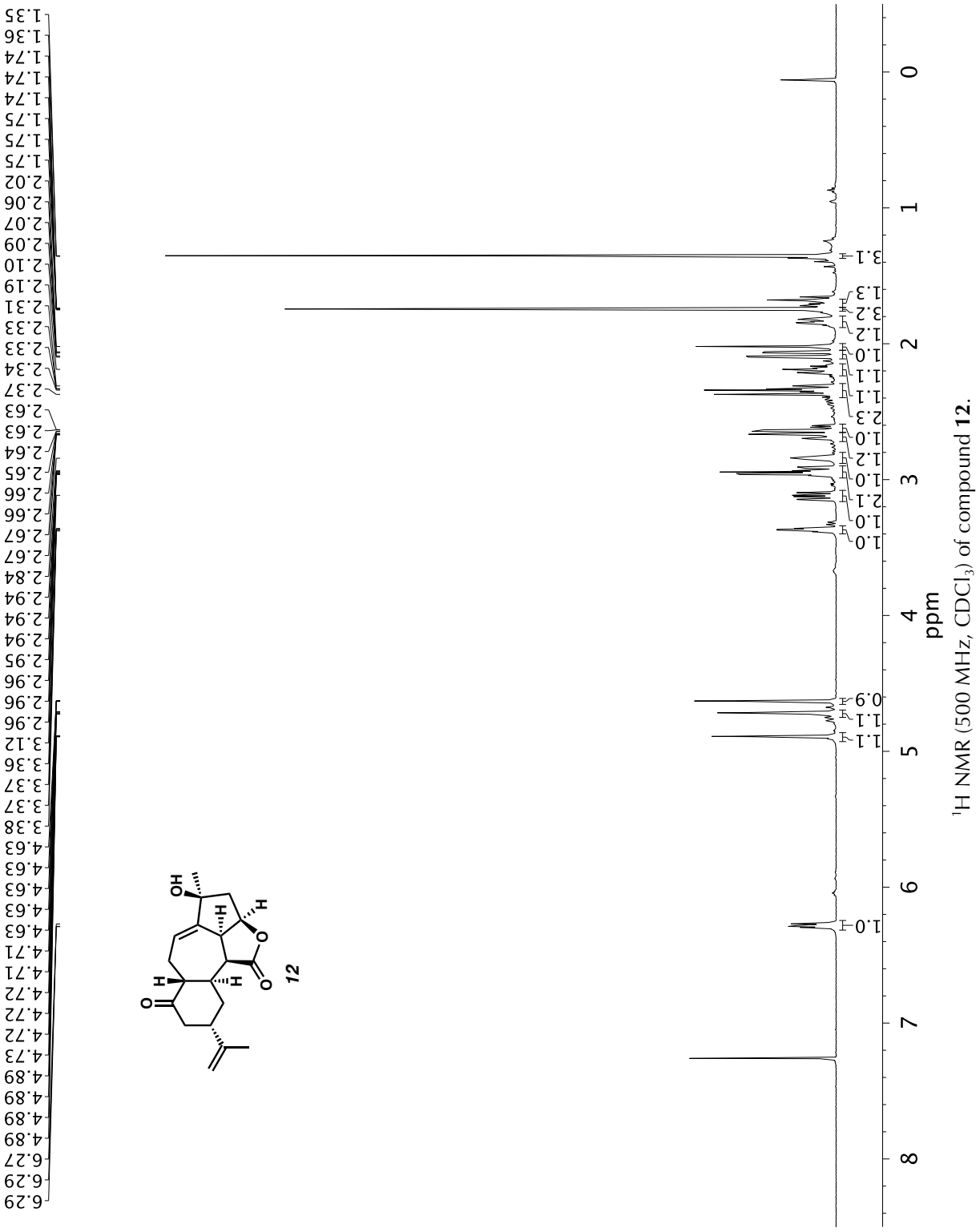
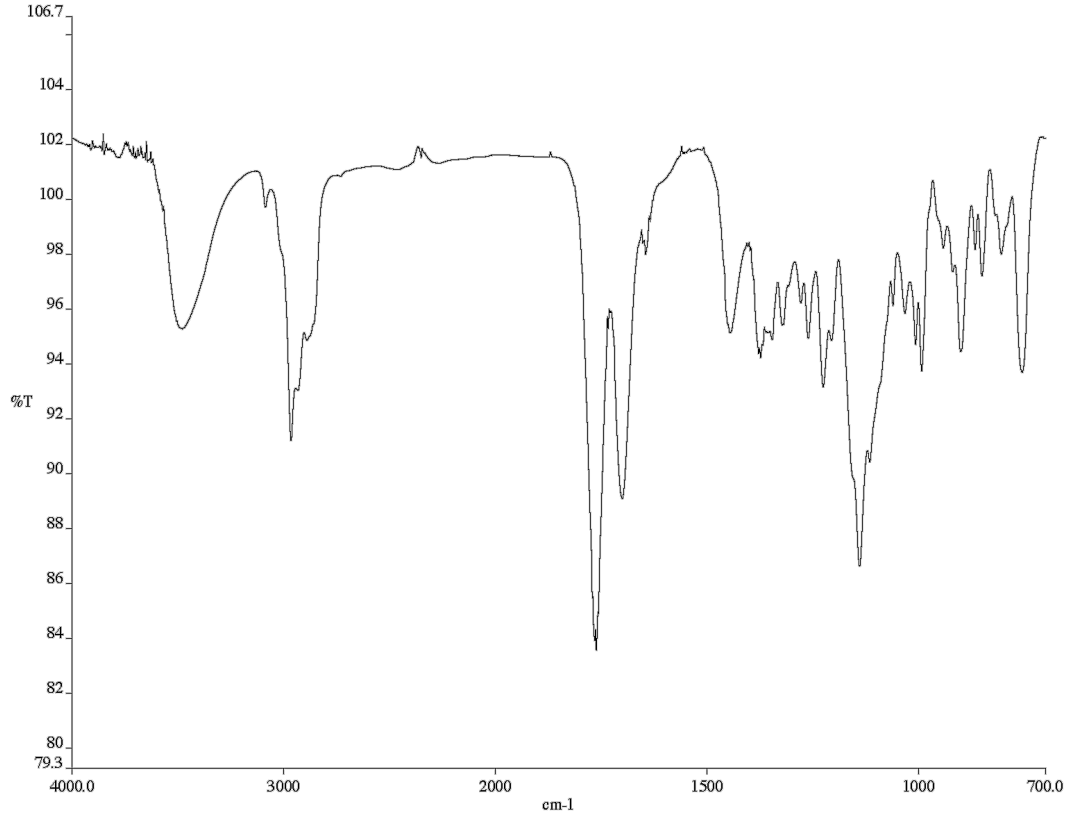
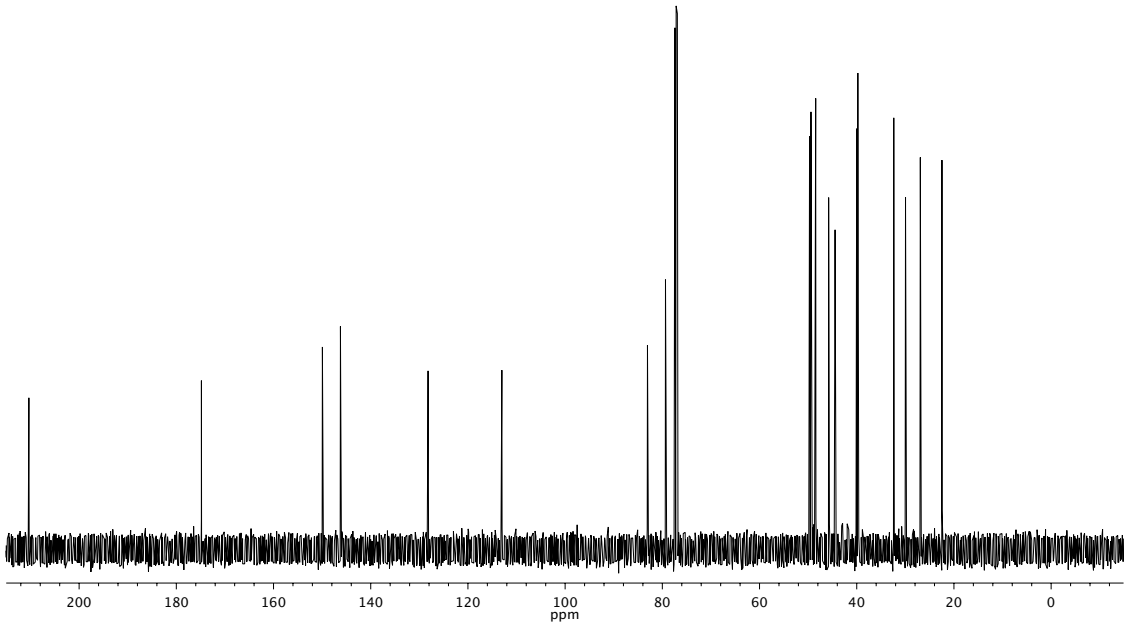


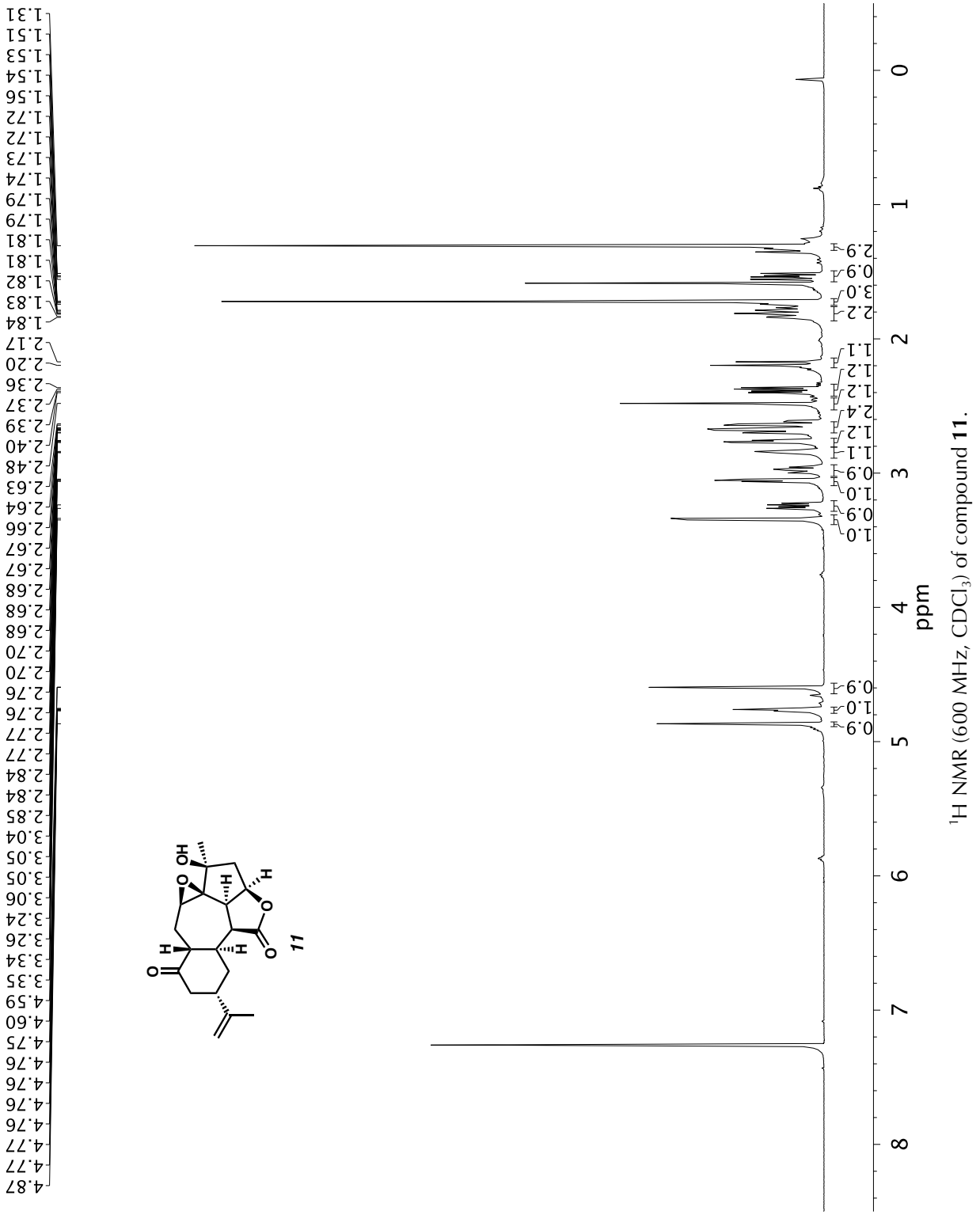
^{1}H NMR (500 MHz, $CDCl_3$) of compound **12**.



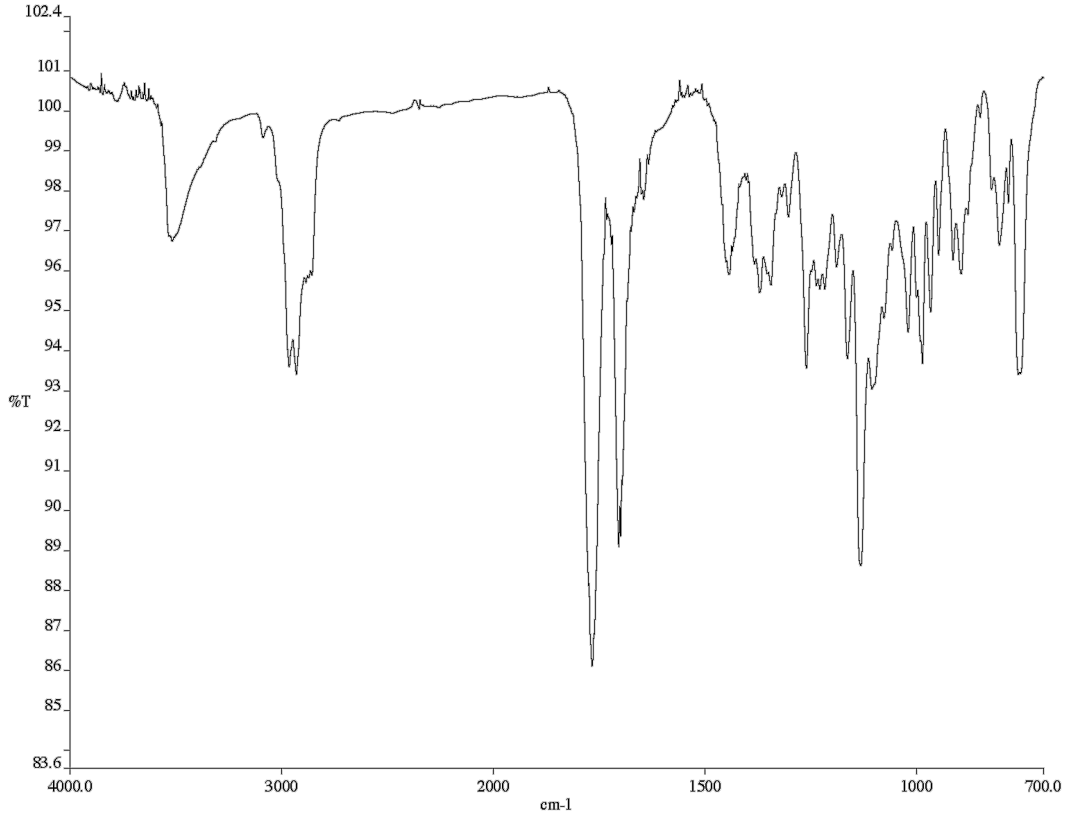
Infrared spectrum (Thin Film, NaCl) of compound **12**.



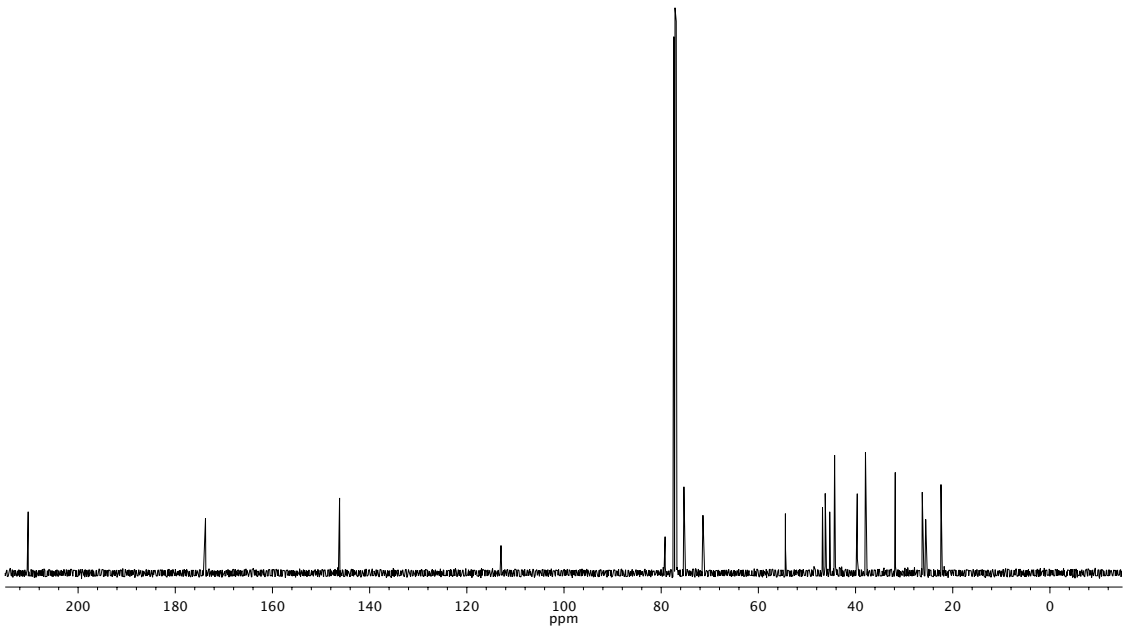
^{13}C NMR (126 MHz, $CDCl_3$) of compound **12**.



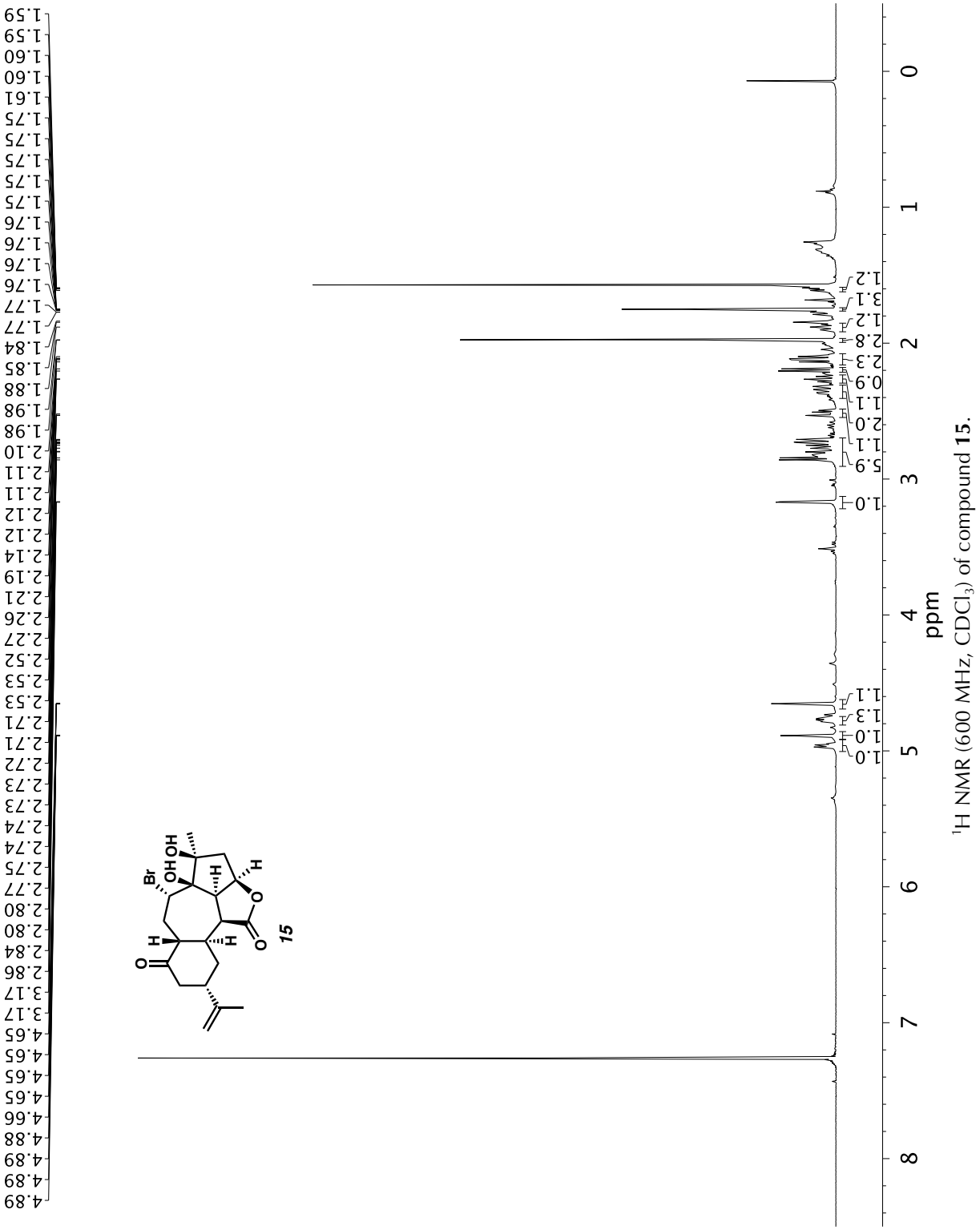
^{1}H NMR (600 MHz, $CDCl_3$) of compound **11**.



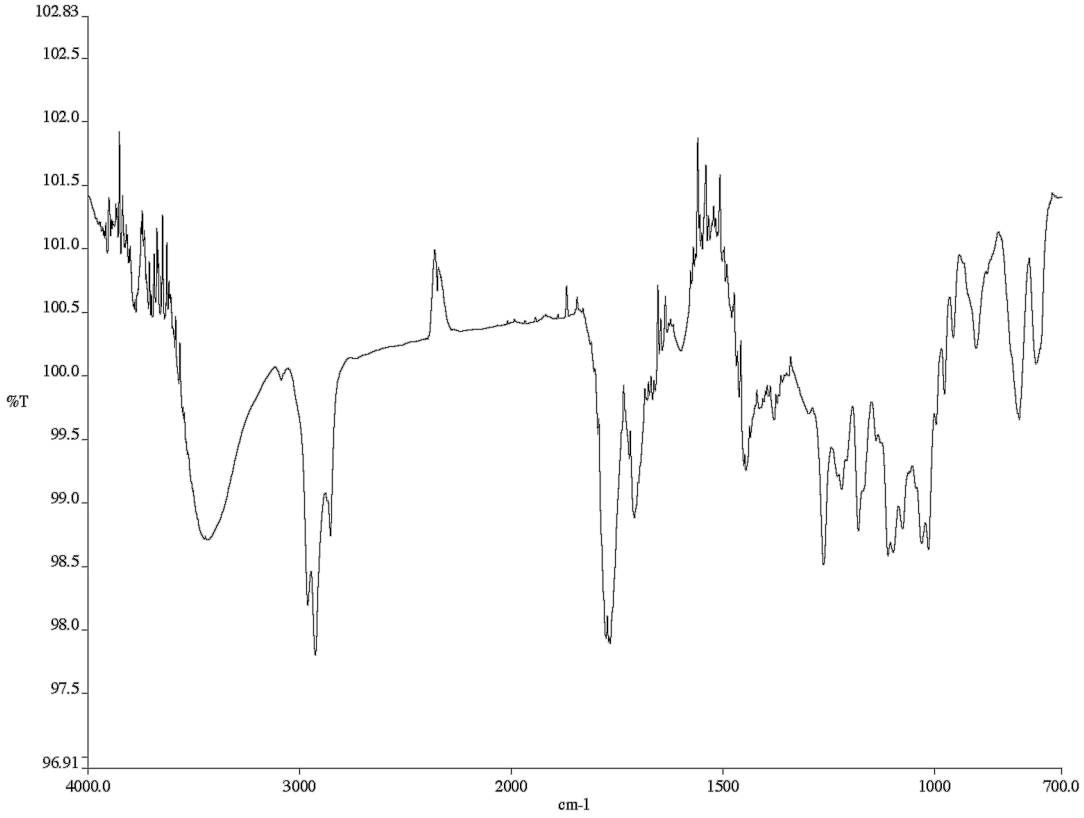
Infrared spectrum (Thin Film, NaCl) of compound **11**.



^{13}C NMR (126 MHz, $CDCl_3$) of compound **11**.



^{1}H NMR (600 MHz, $CDCl_3$) of compound **15**.



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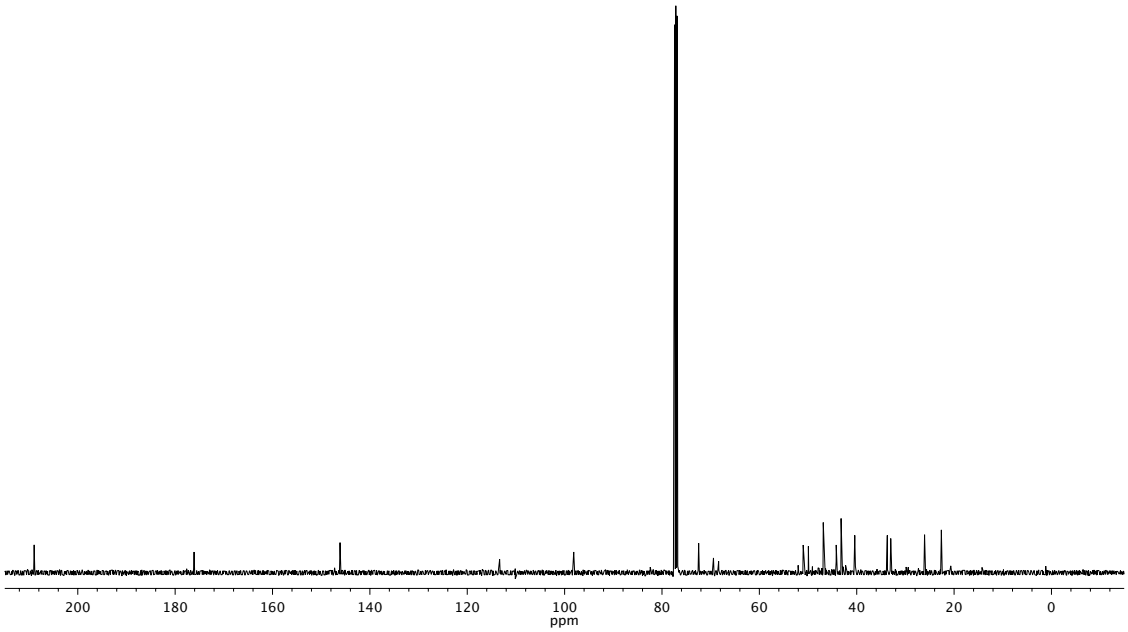

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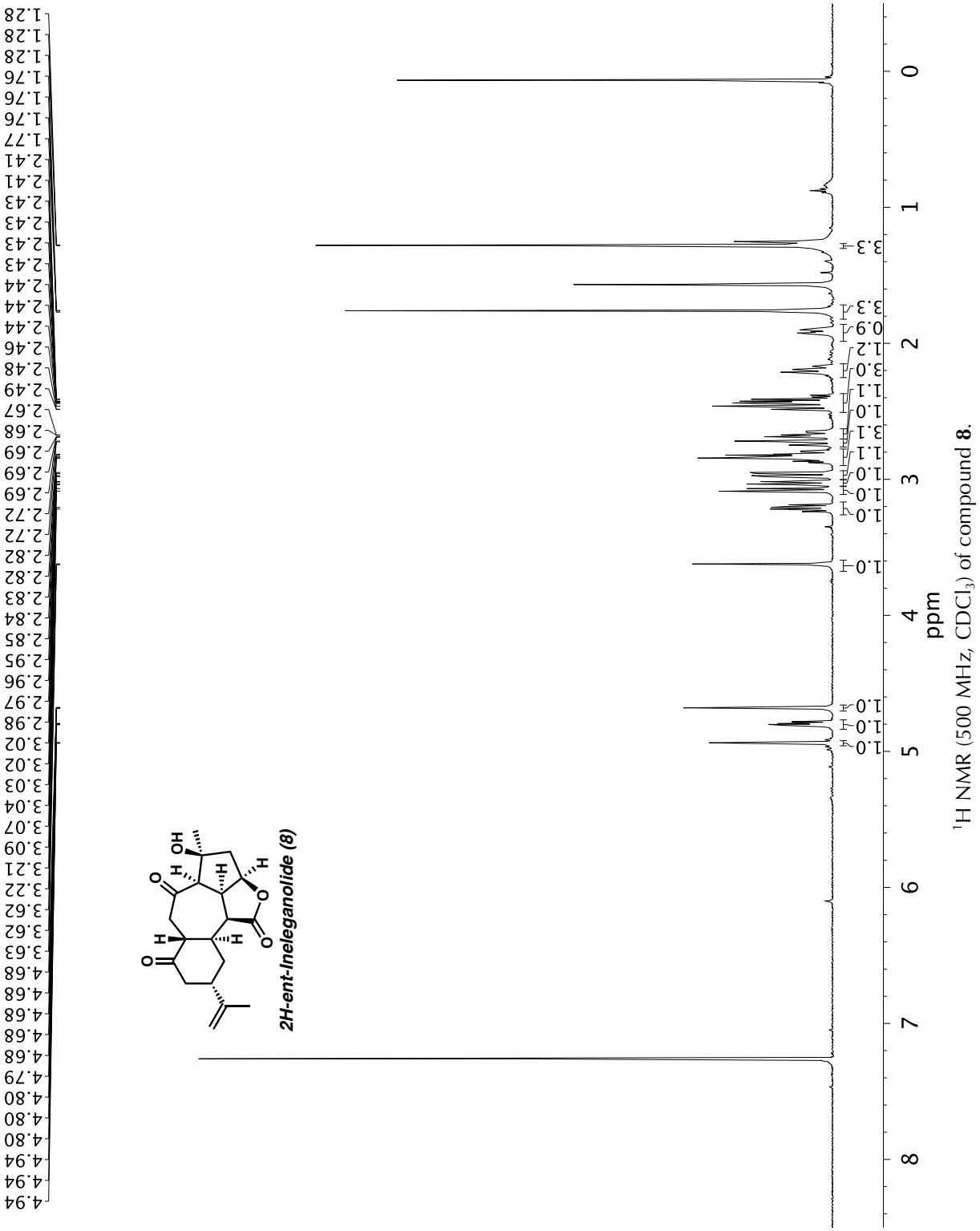
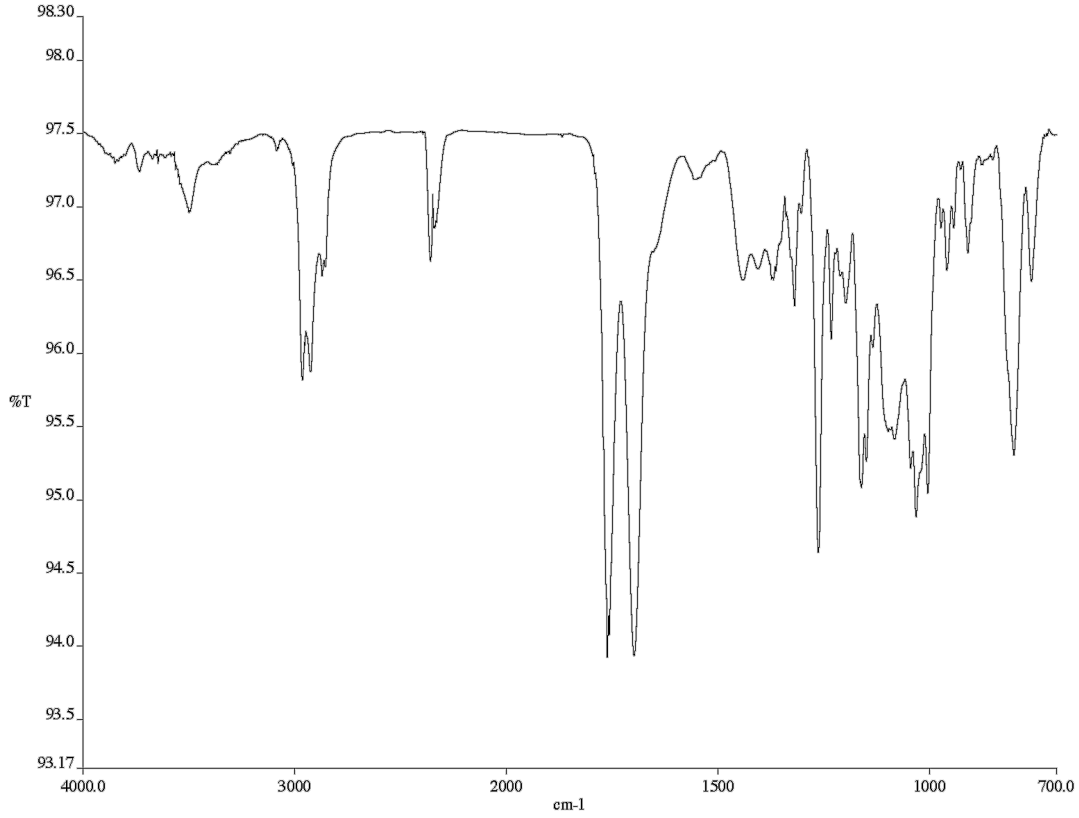


^{1}H NMR (500 MHz, $CDCl_3$) of compound **8**.



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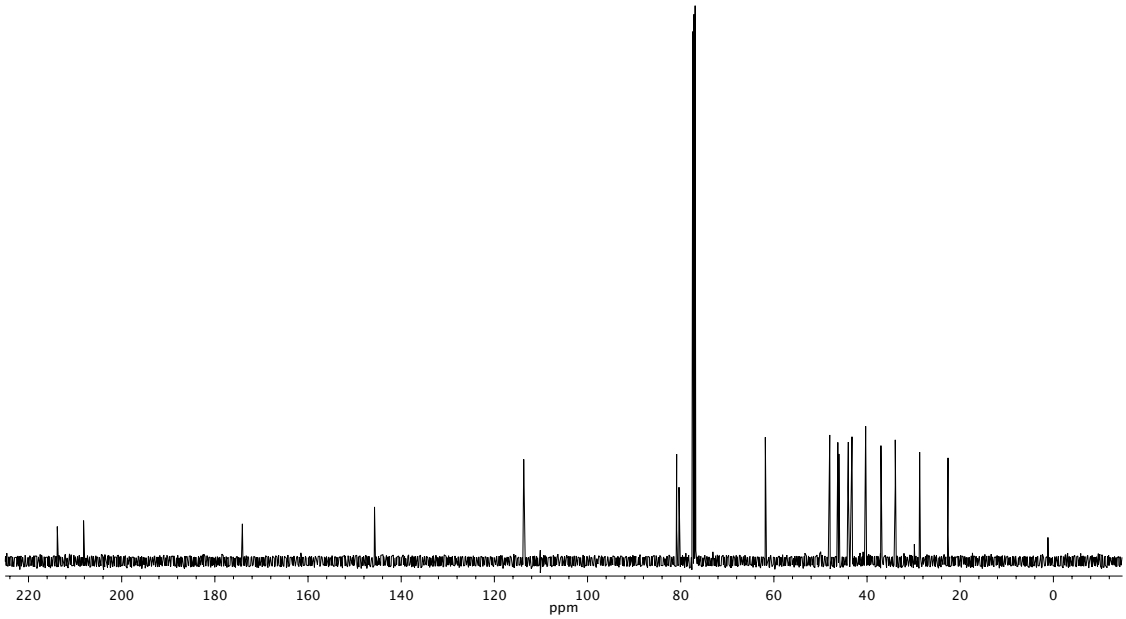
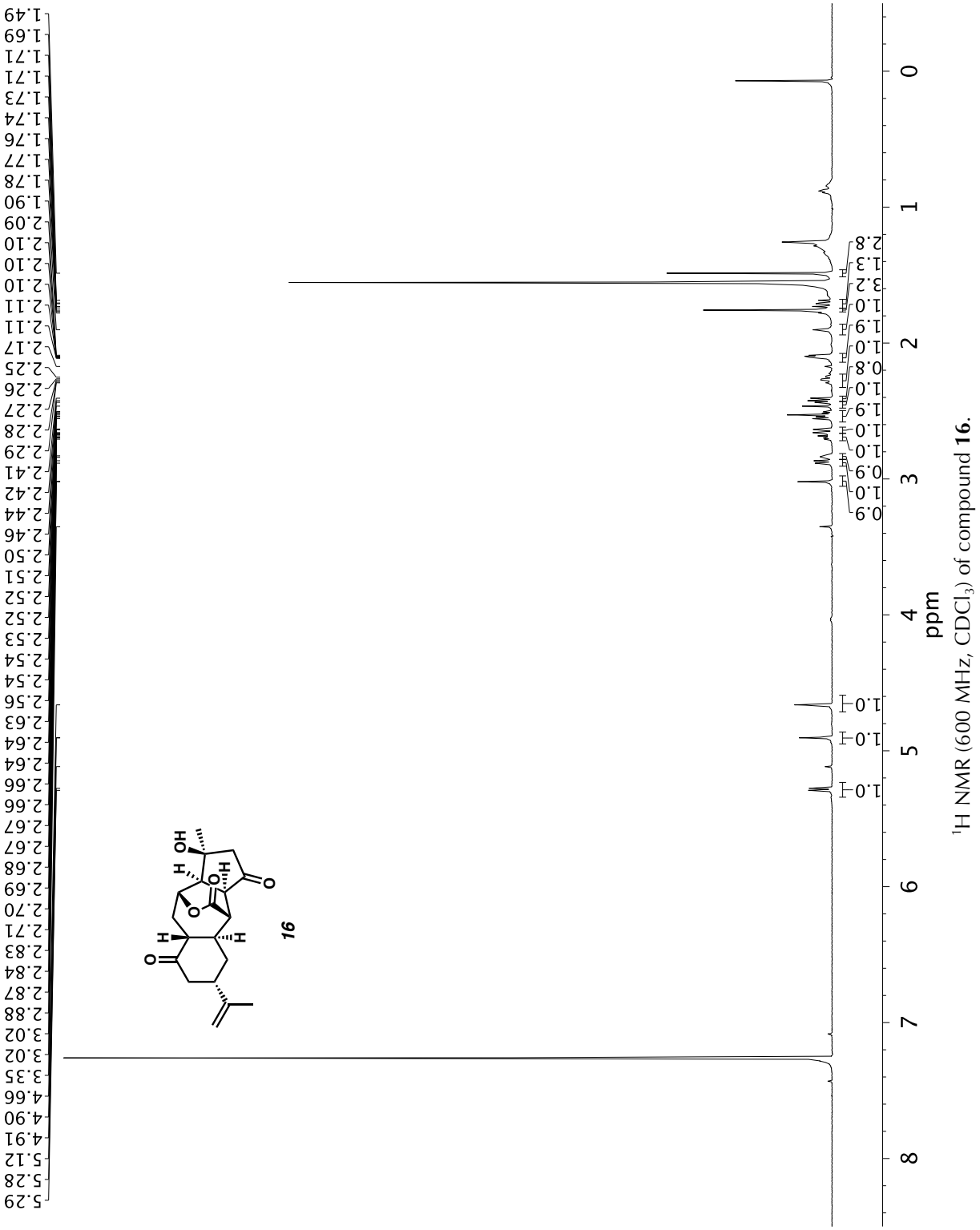
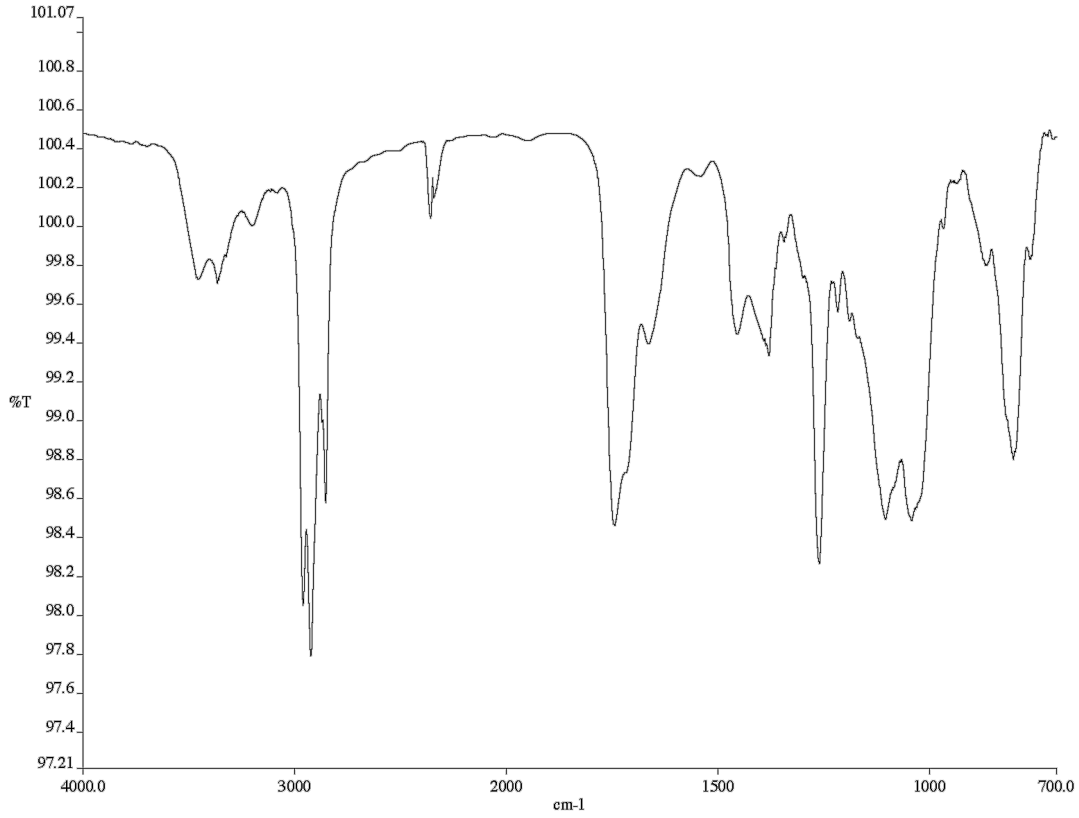


^{13}C NMR (126 MHz, $CDCl_3$) of compound **8**.



^{1}H NMR (600 MHz, $CDCl_3$) of compound **16**.



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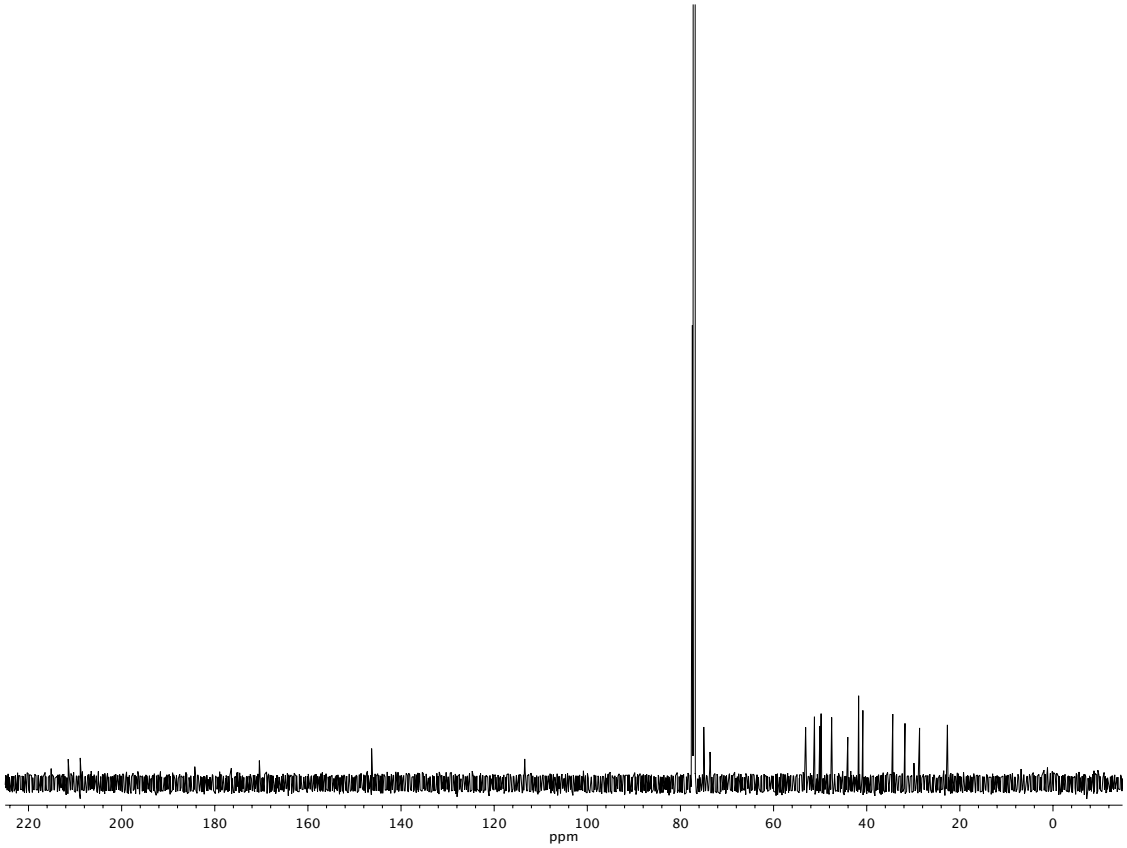
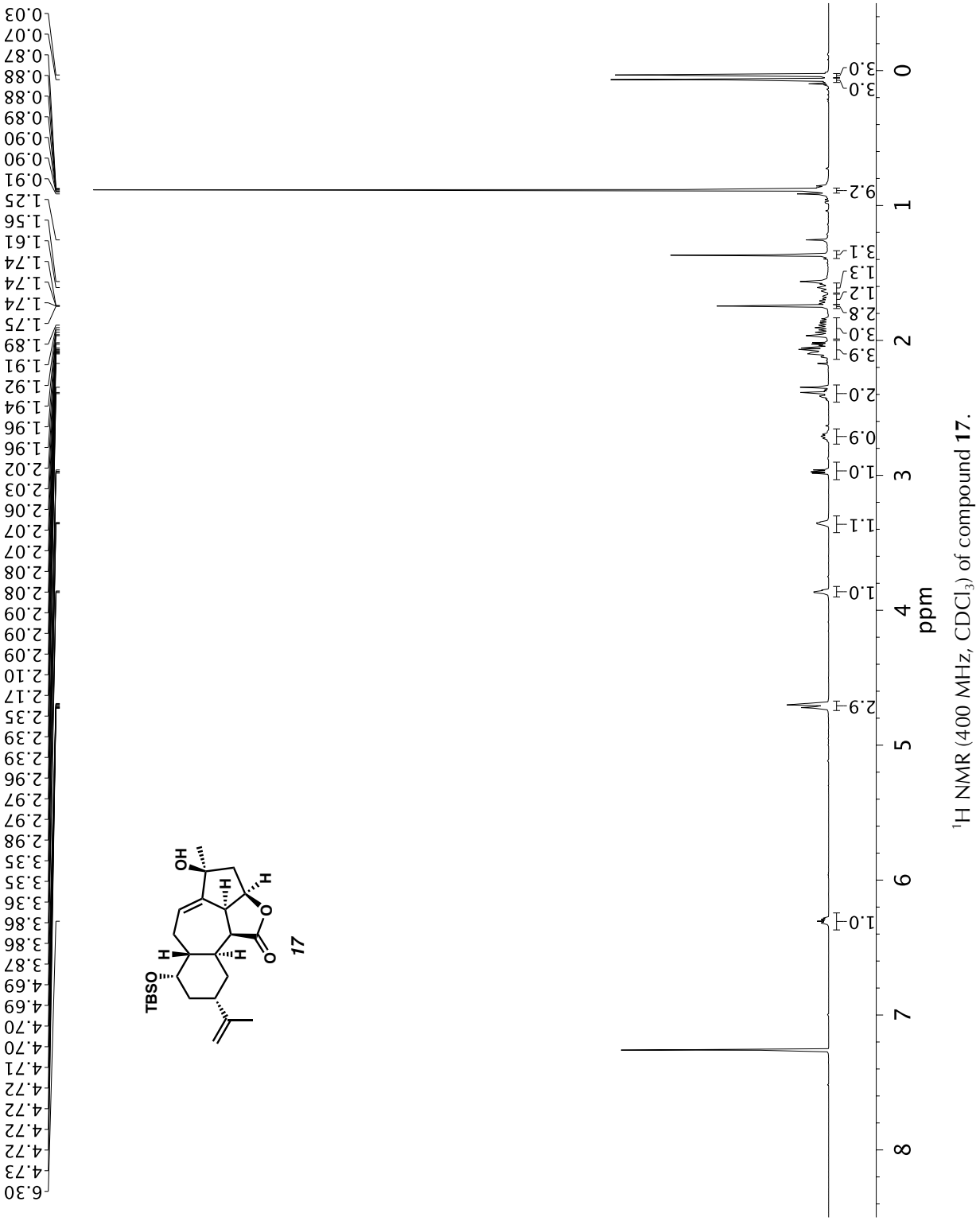
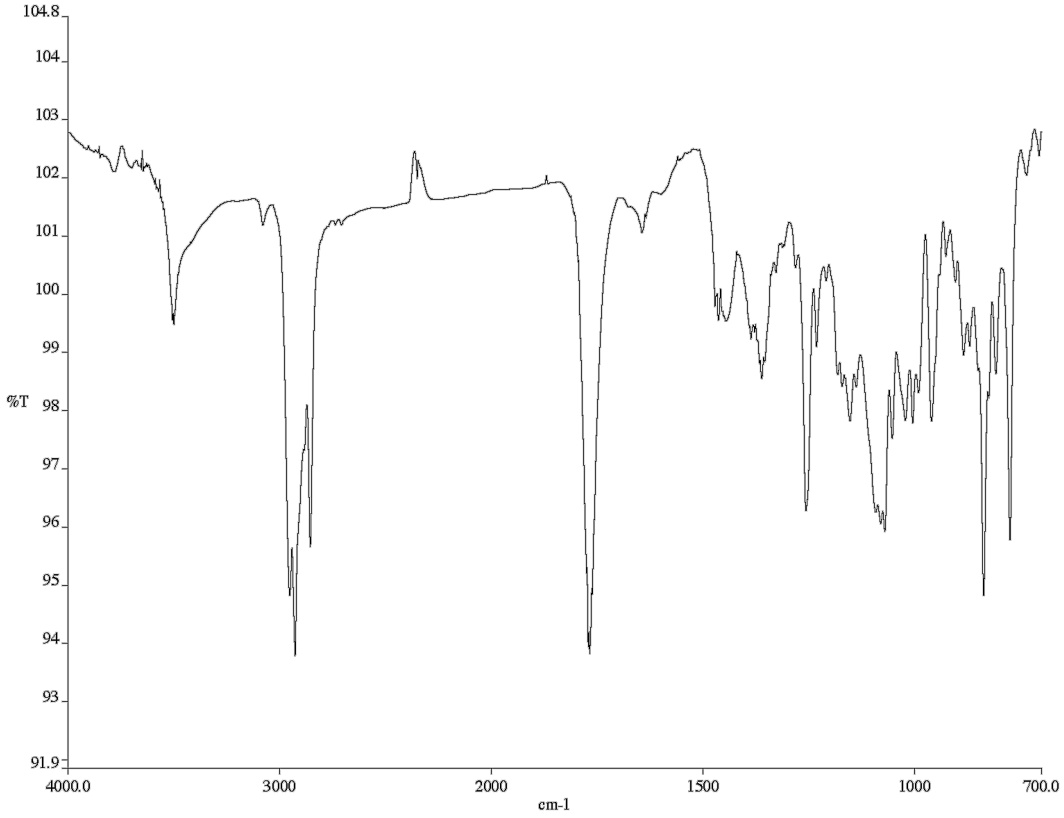


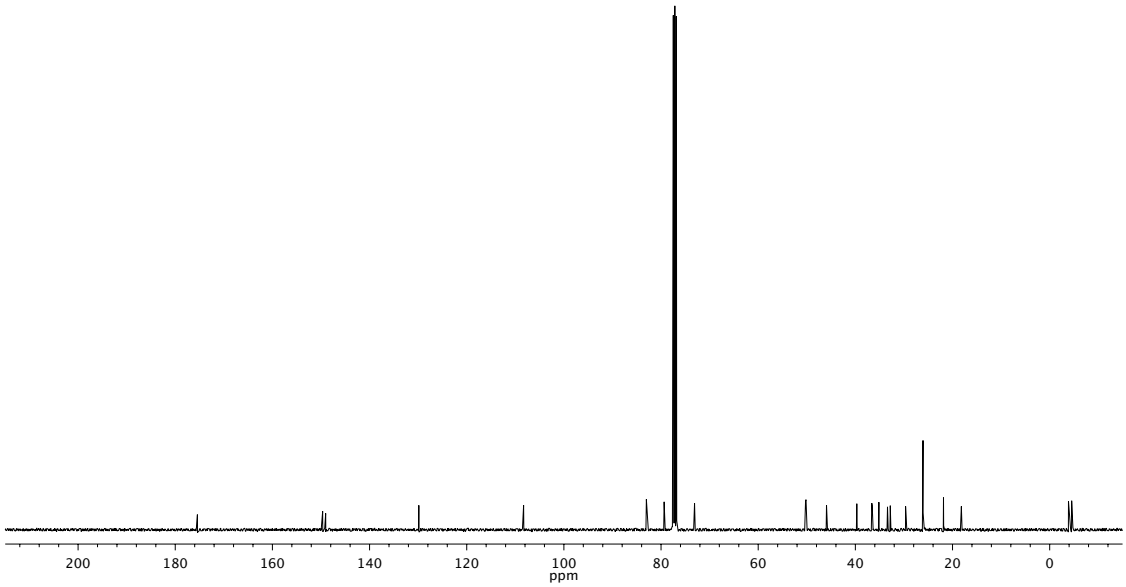
^{13}C NMR (126 MHz, $CDCl_3$) of compound **16**.



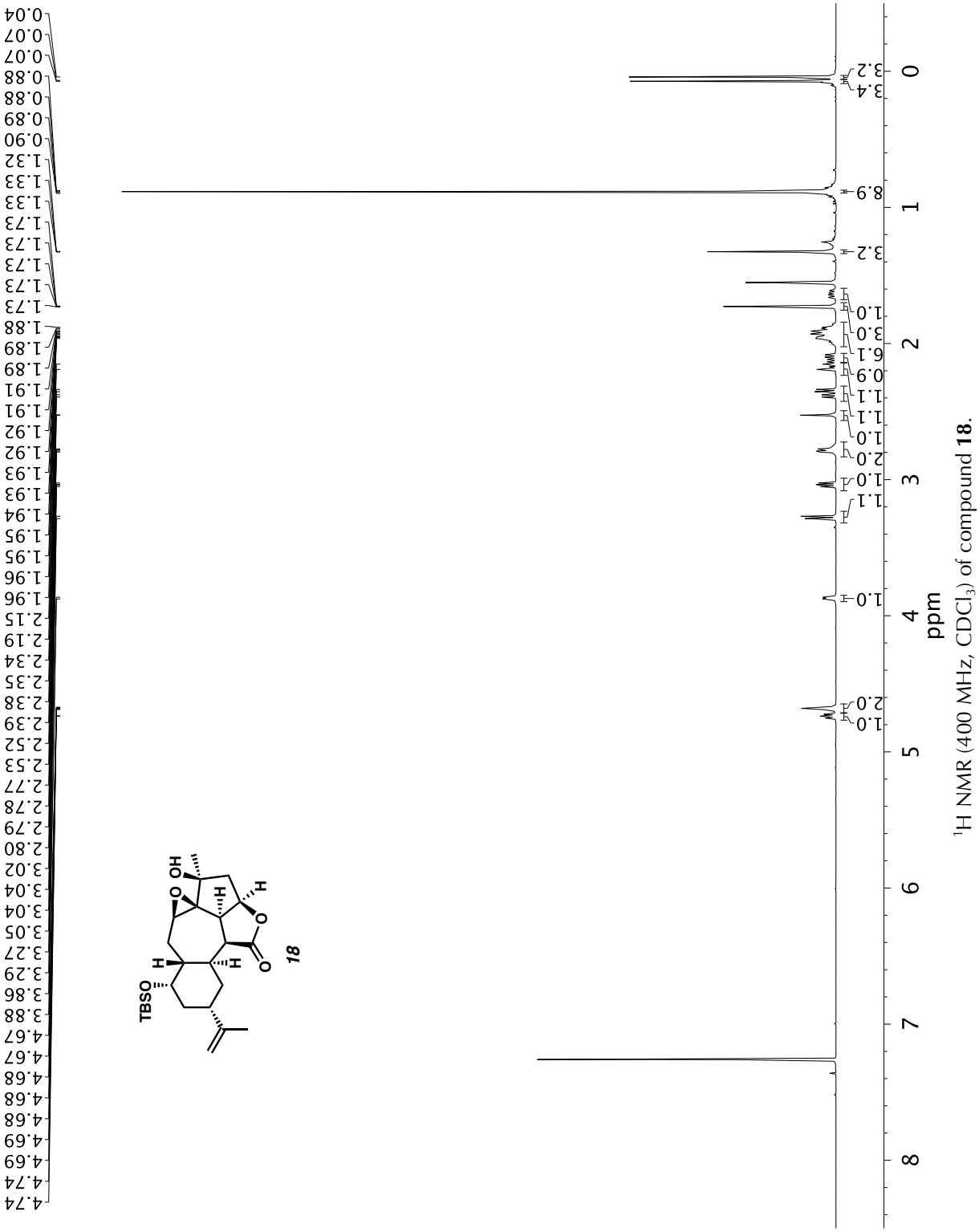
^{1}H NMR (400 MHz, $CDCl_3$) of compound **17**.



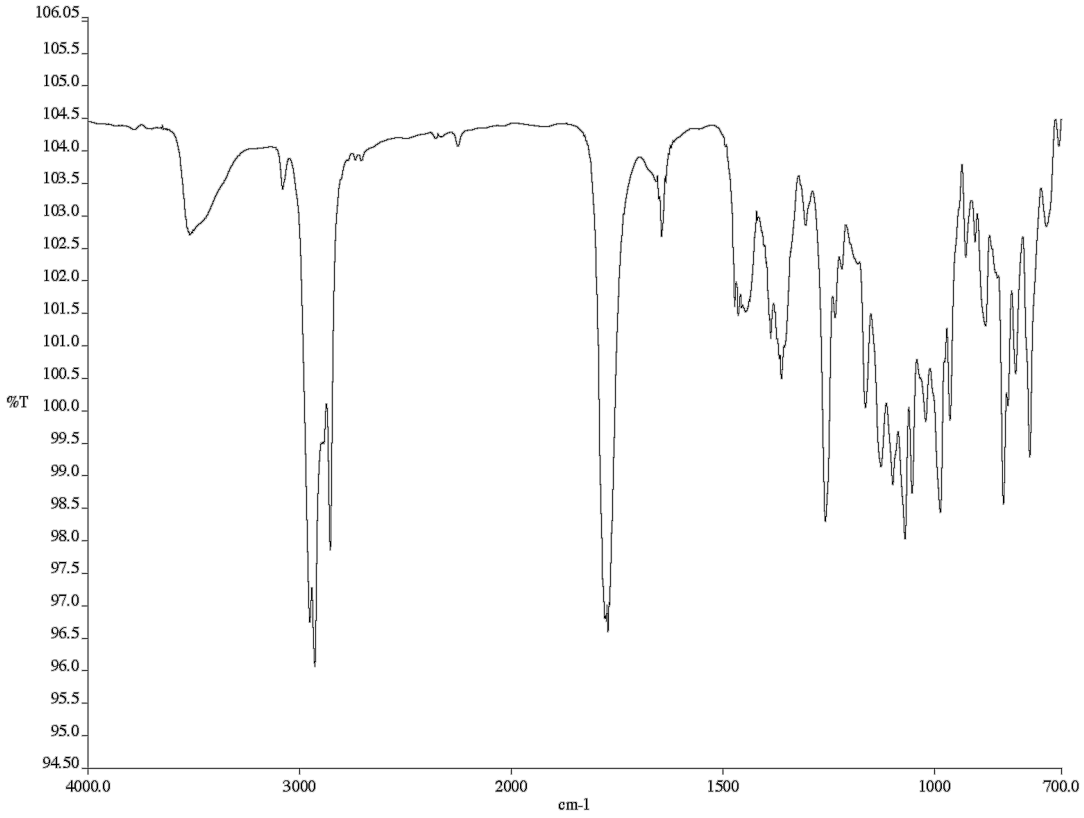
Infrared spectrum (Thin Film, NaCl) of compound **17**.



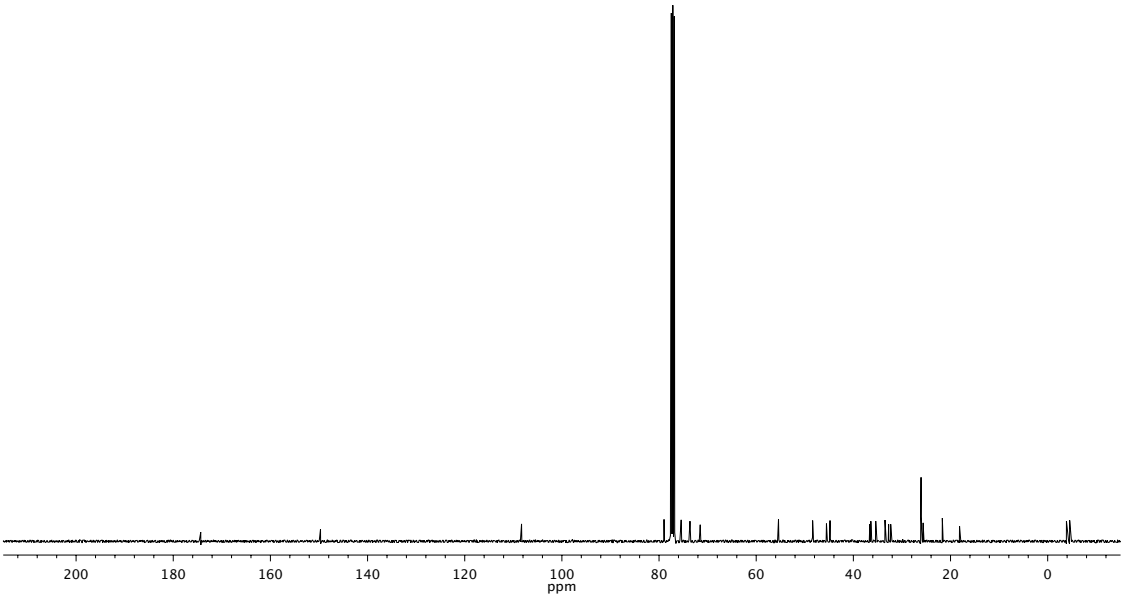
^{13}C NMR (101 MHz, $CDCl_3$) of compound **17**.



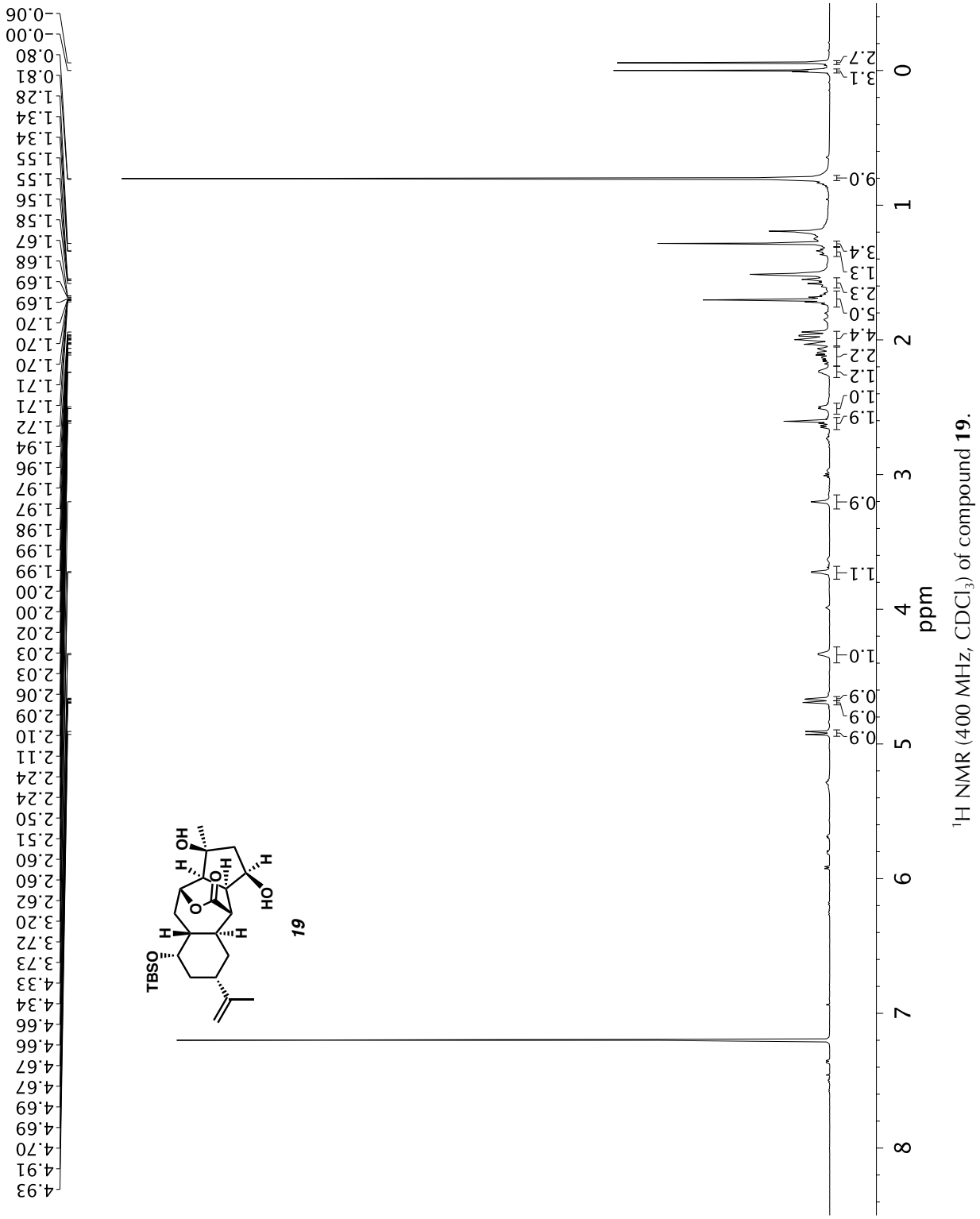
^{1}H NMR (400 MHz, $CDCl_3$) of compound **18**.



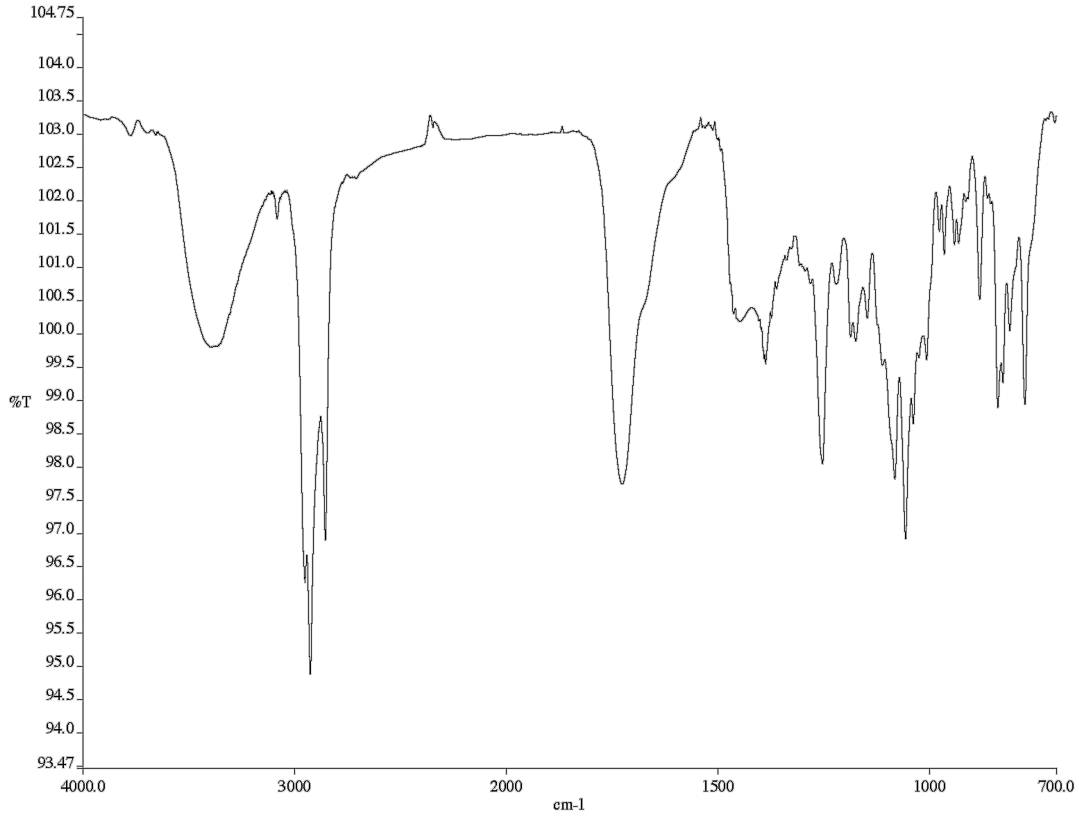
Infrared spectrum (Thin Film, NaCl) of compound **18**.



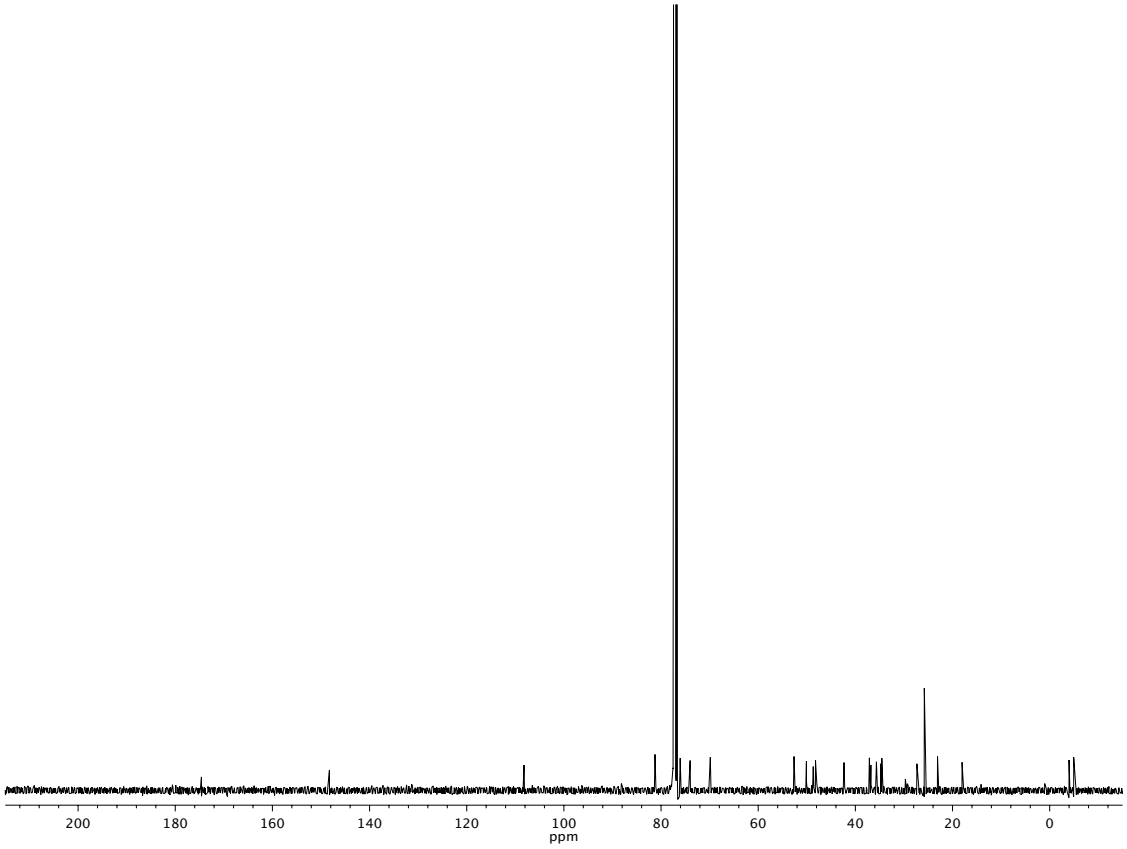
^{13}C NMR (101 MHz, $CDCl_3$) of compound **18**.



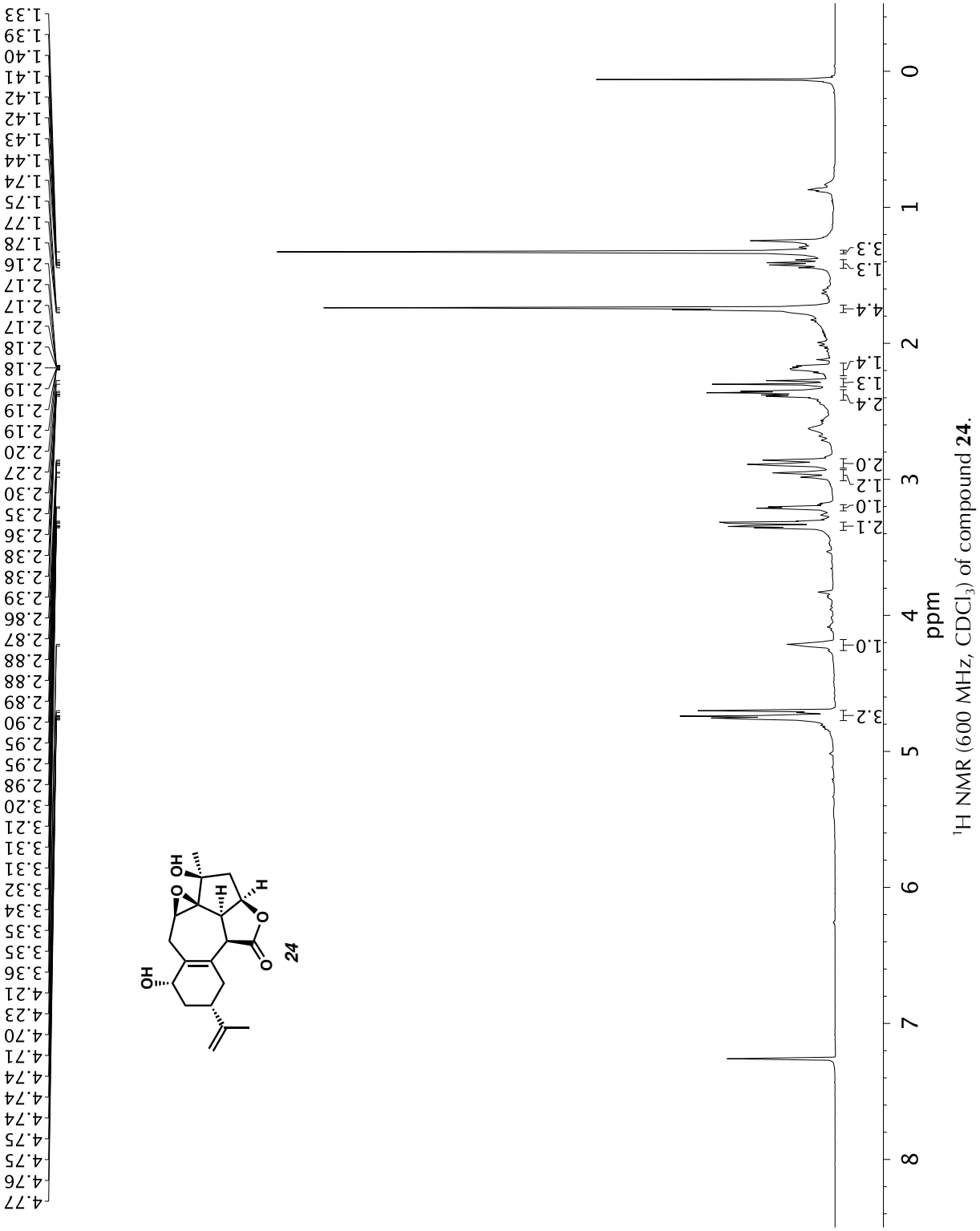
^{1}H NMR (400 MHz, $CDCl_3$) of compound **19**.



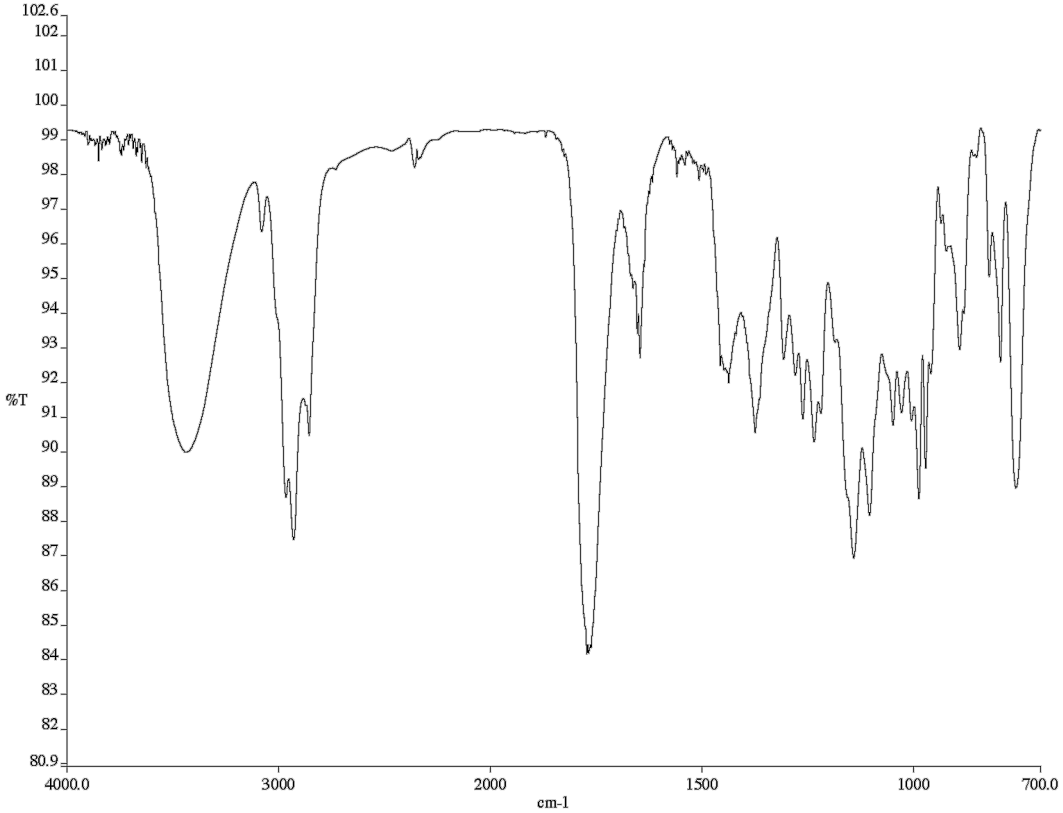
Infrared spectrum (Thin Film, NaCl) of compound **19**.



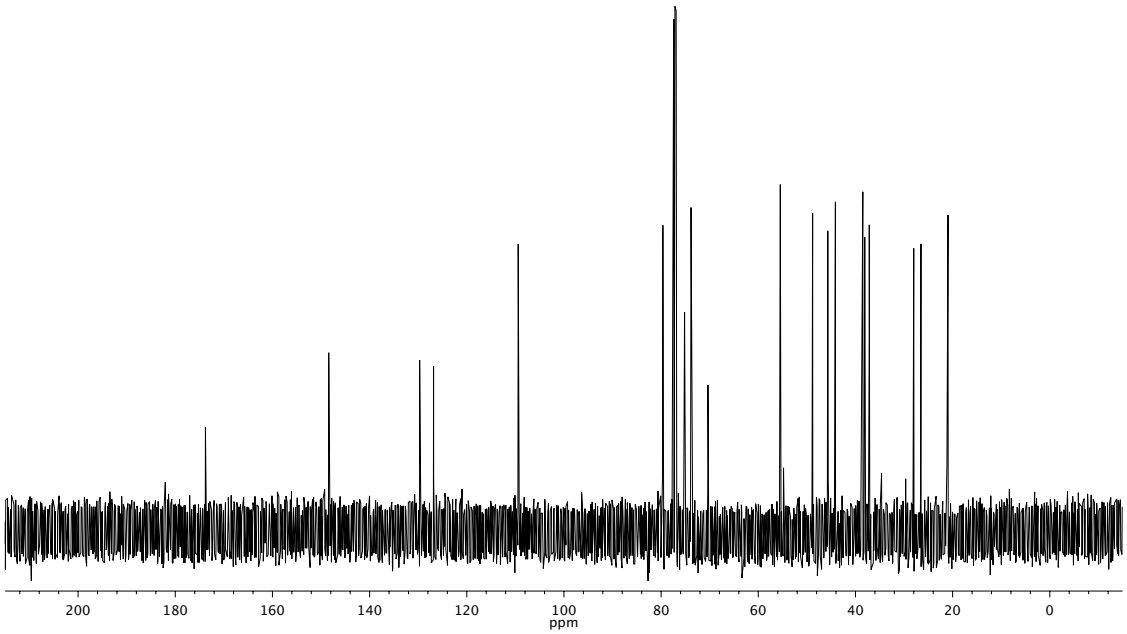
^{13}C NMR (101 MHz, $CDCl_3$) of compound **19**.



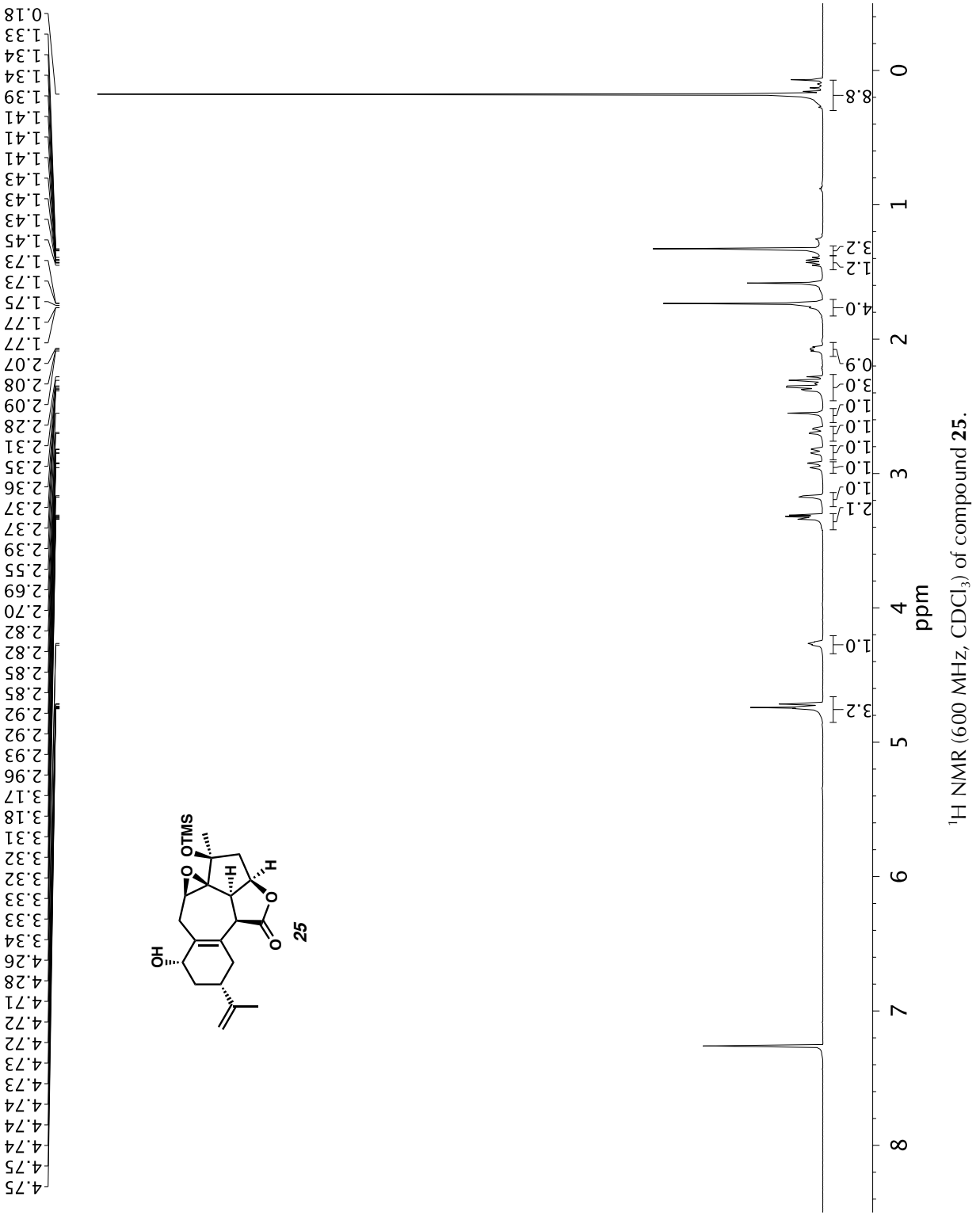
^{1}H NMR (600 MHz, $CDCl_3$) of compound **24**.



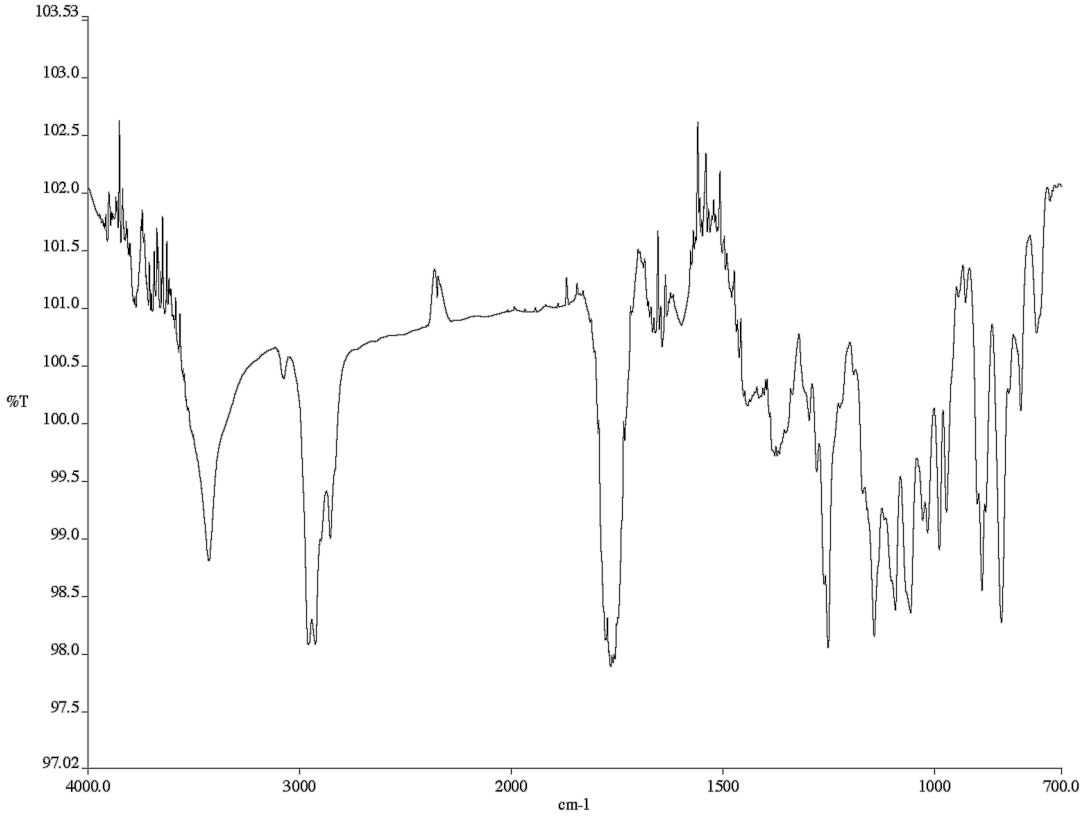
Infrared spectrum (Thin Film, NaCl) of compound **24**.



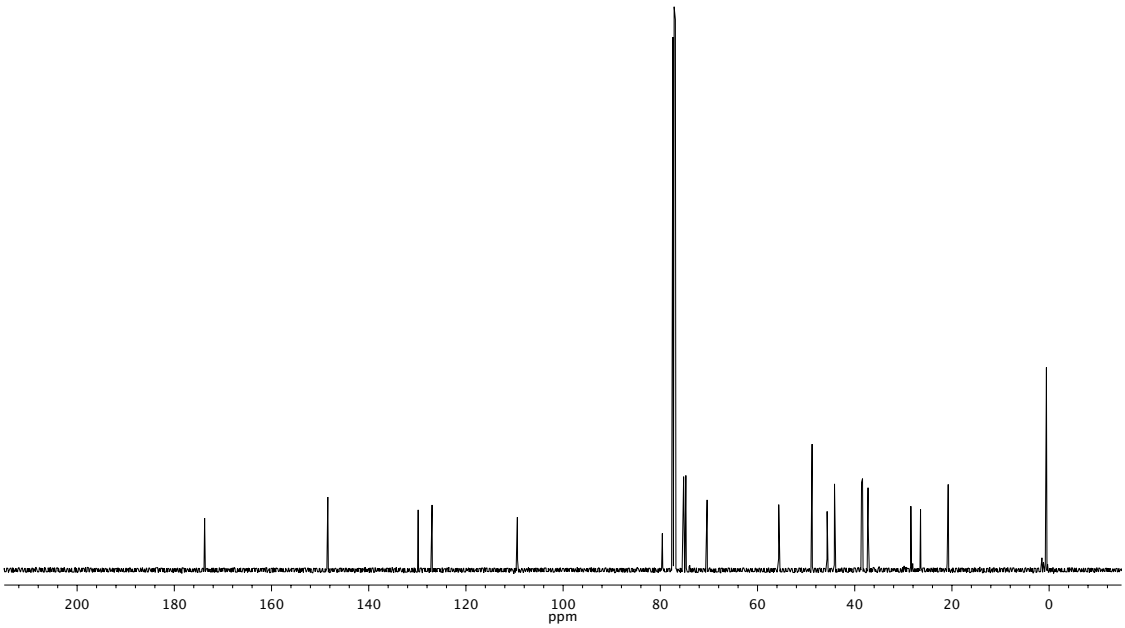
^{13}C NMR (126 MHz, $CDCl_3$) of compound **24**.



^{1}H NMR (600 MHz, $CDCl_3$) of compound **25**.



Infrared spectrum (Thin Film, NaCl) of compound **25**.



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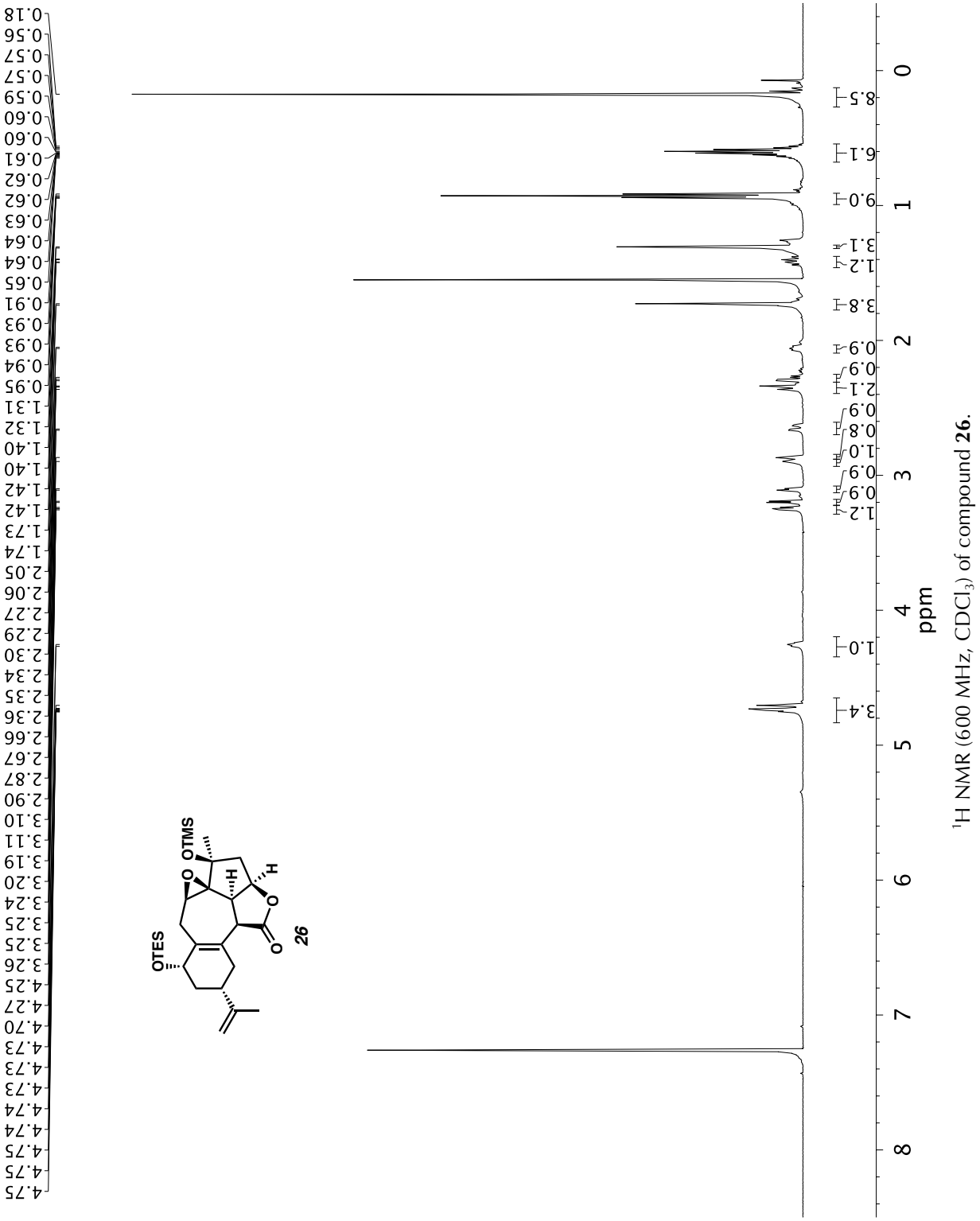
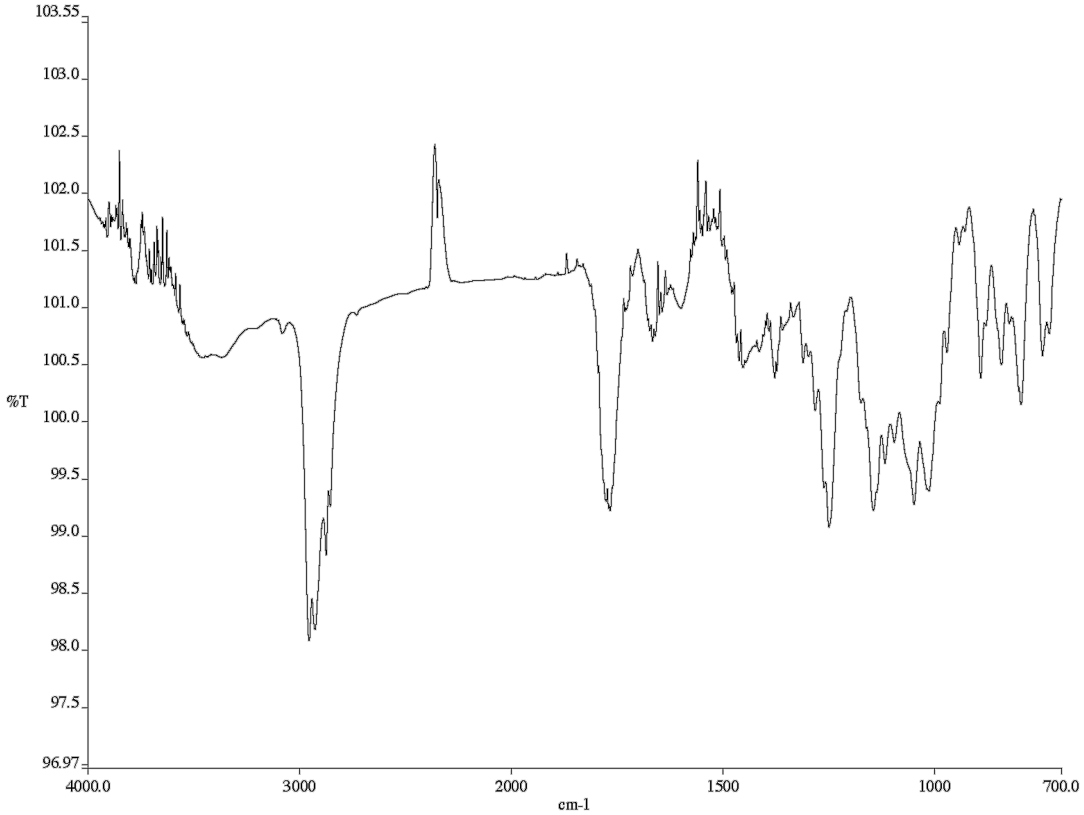
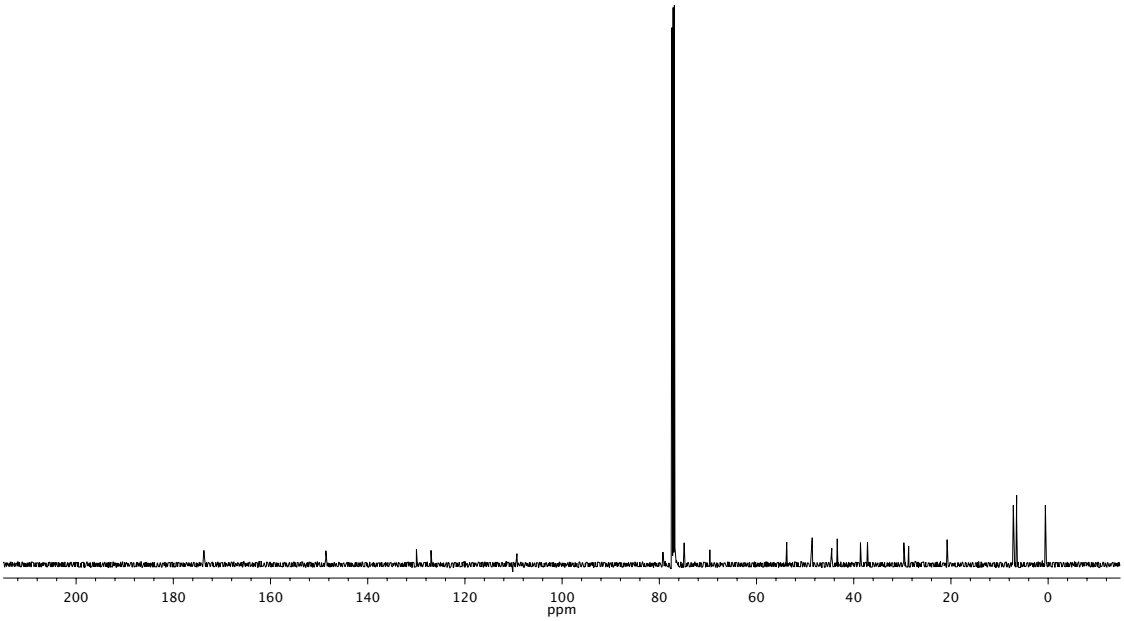


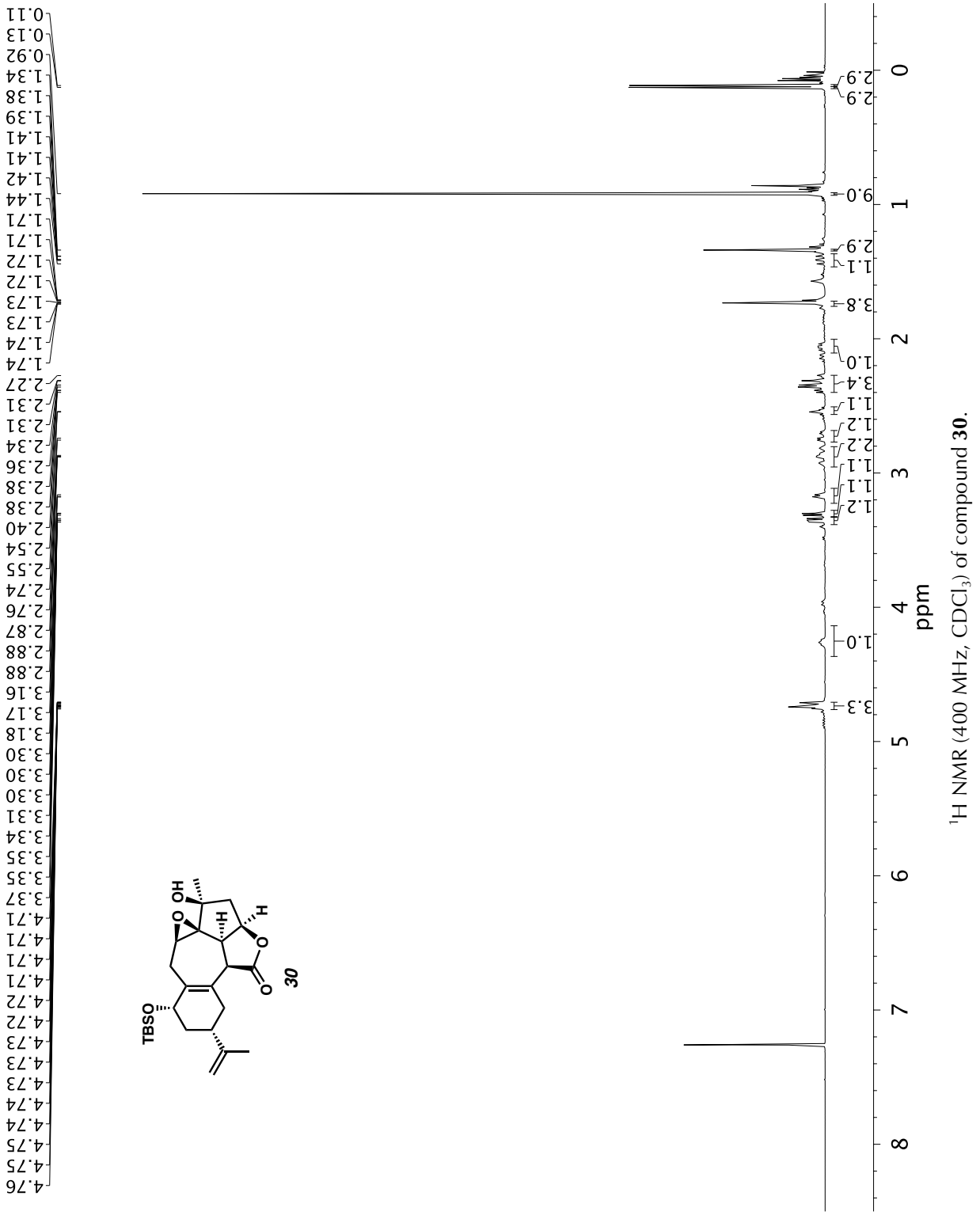
^{1}H NMR (600 MHz, $CDCl_3$) of compound **26**.



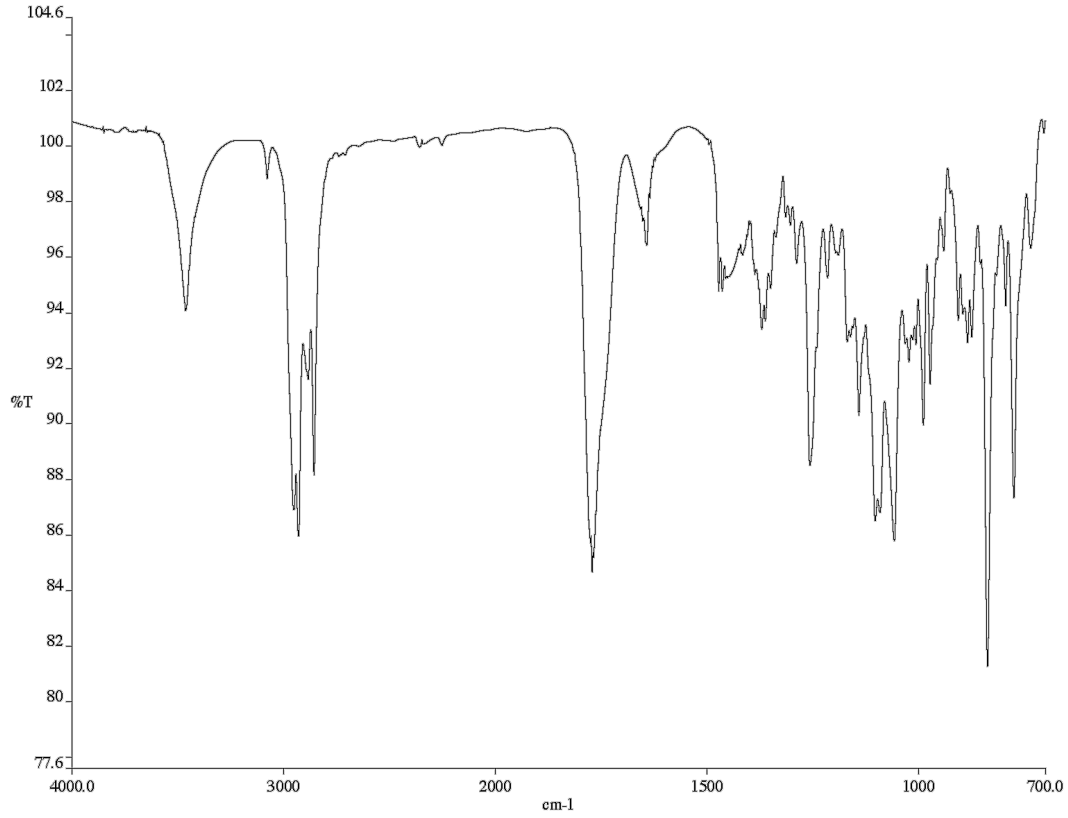
Infrared spectrum (Thin Film, NaCl) of compound **26**.



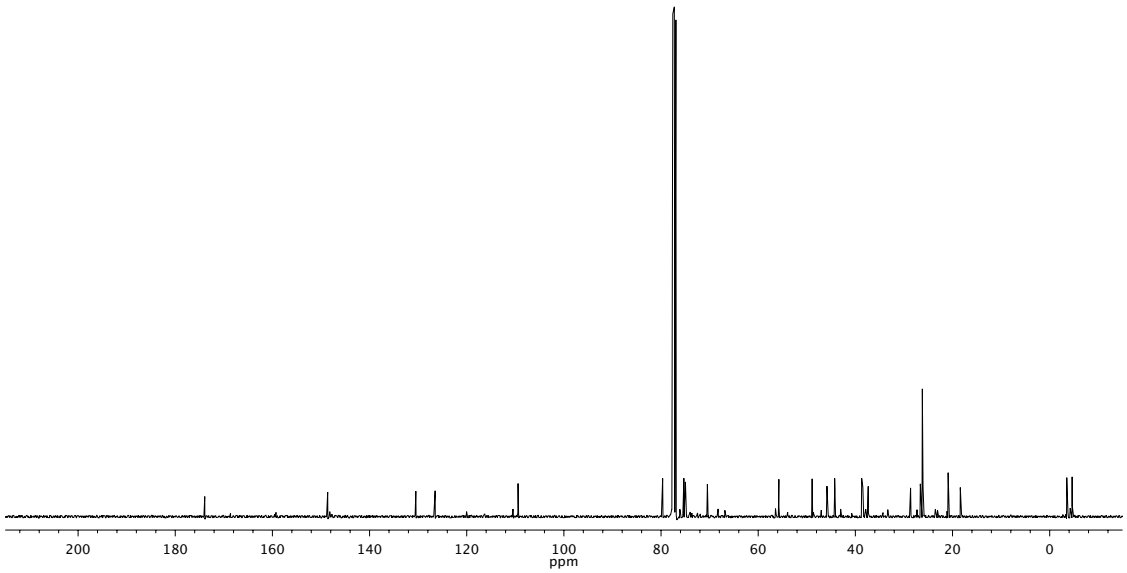
^{13}C NMR (126 MHz, $CDCl_3$) of compound **26**.



^{1}H NMR (400 MHz, $CDCl_3$) of compound **30**.



Infrared spectrum (Thin Film, NaCl) of compound **30**.



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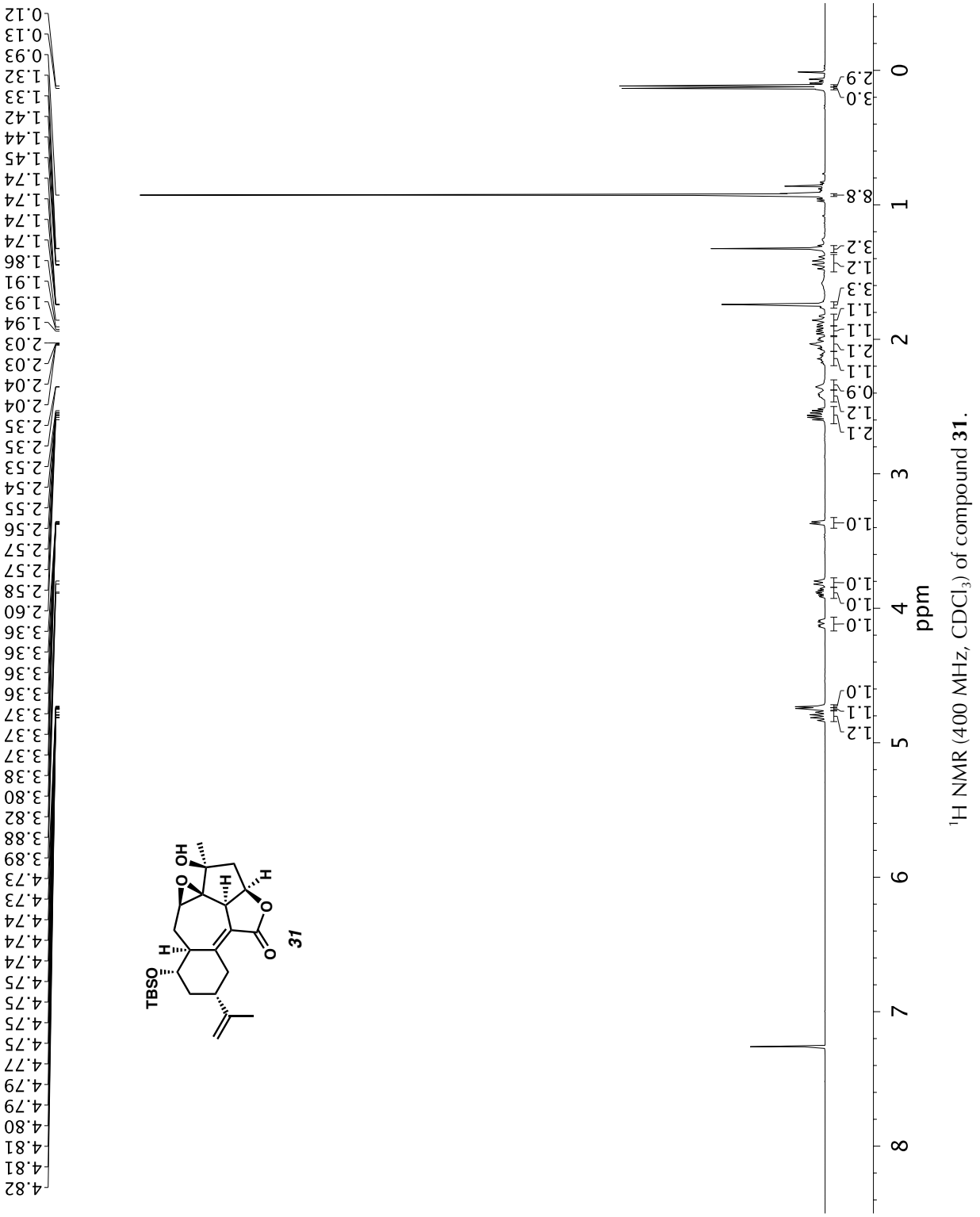
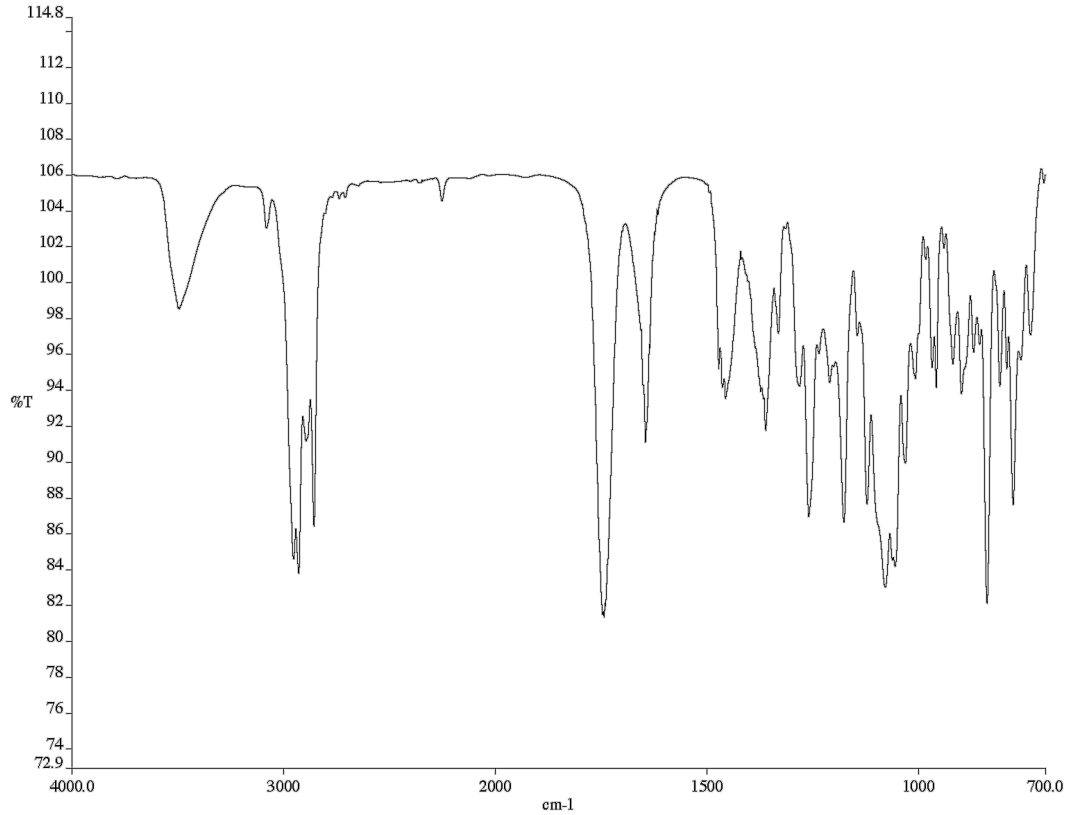
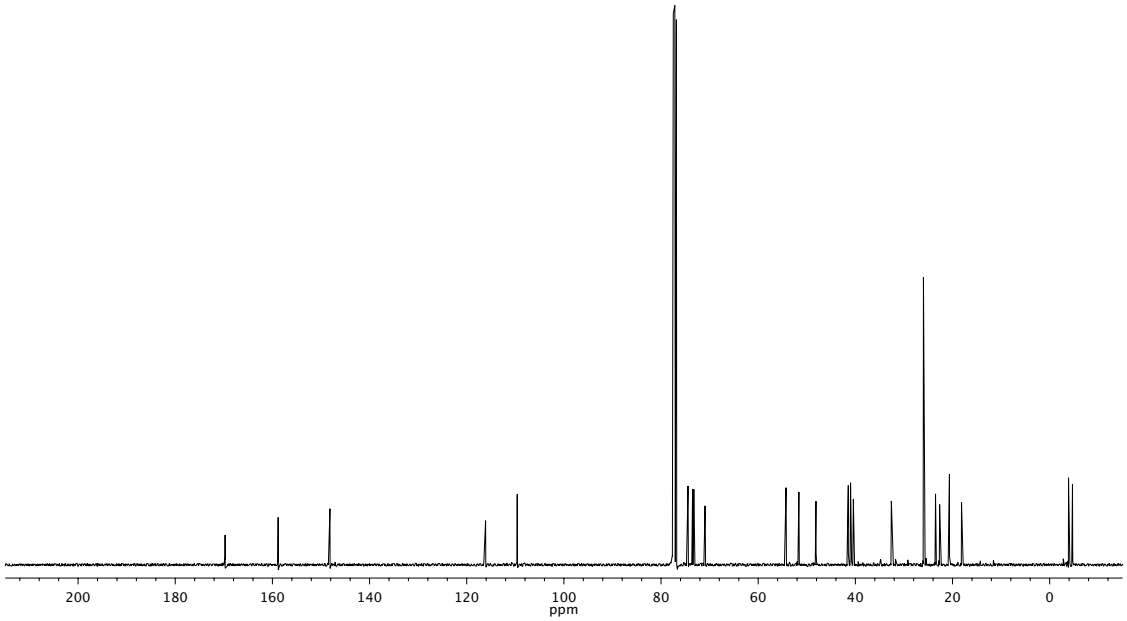


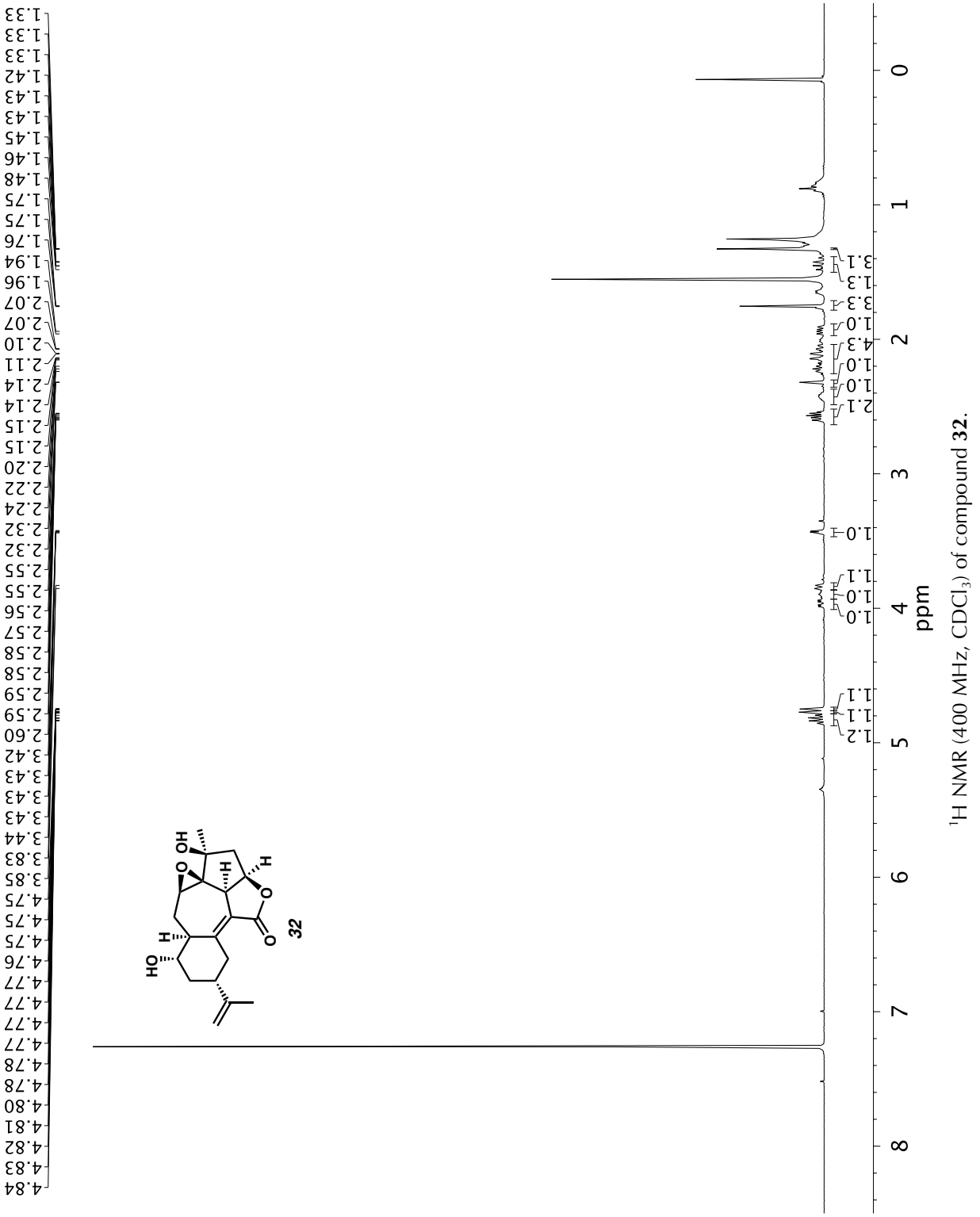
^{1}H NMR (400 MHz, $CDCl_3$) of compound **31**.



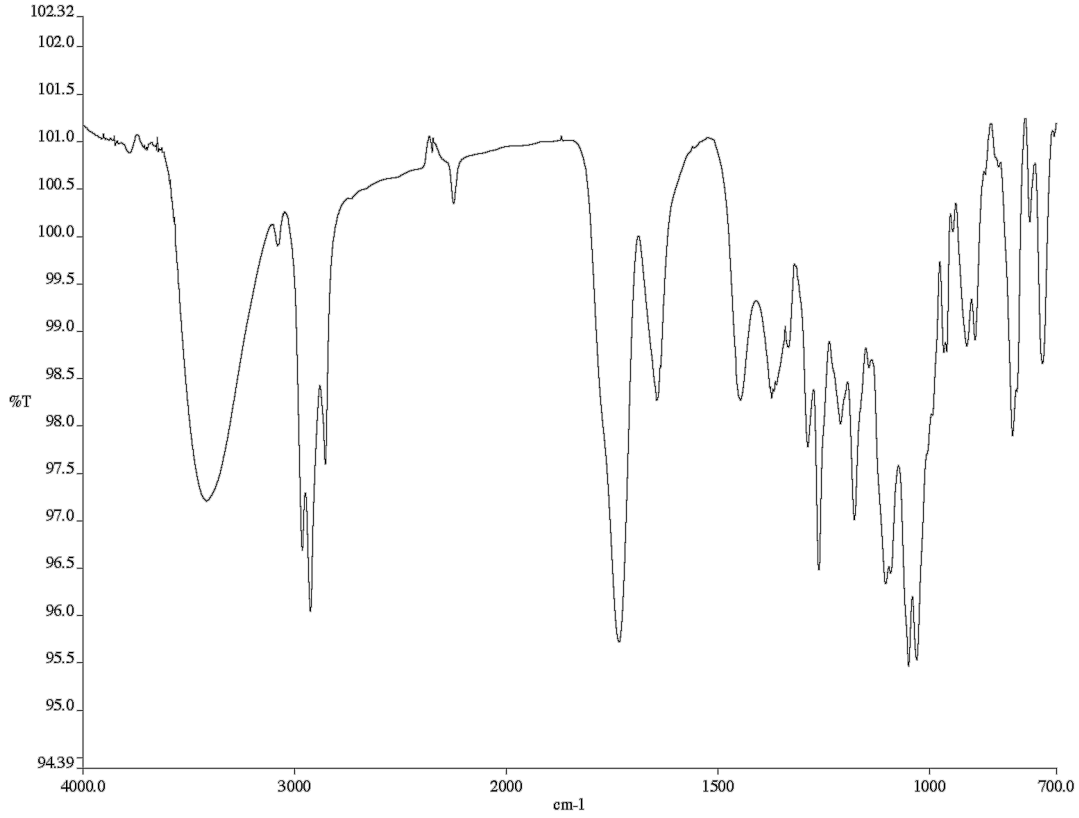
Infrared spectrum (Thin Film, NaCl) of compound **31**.



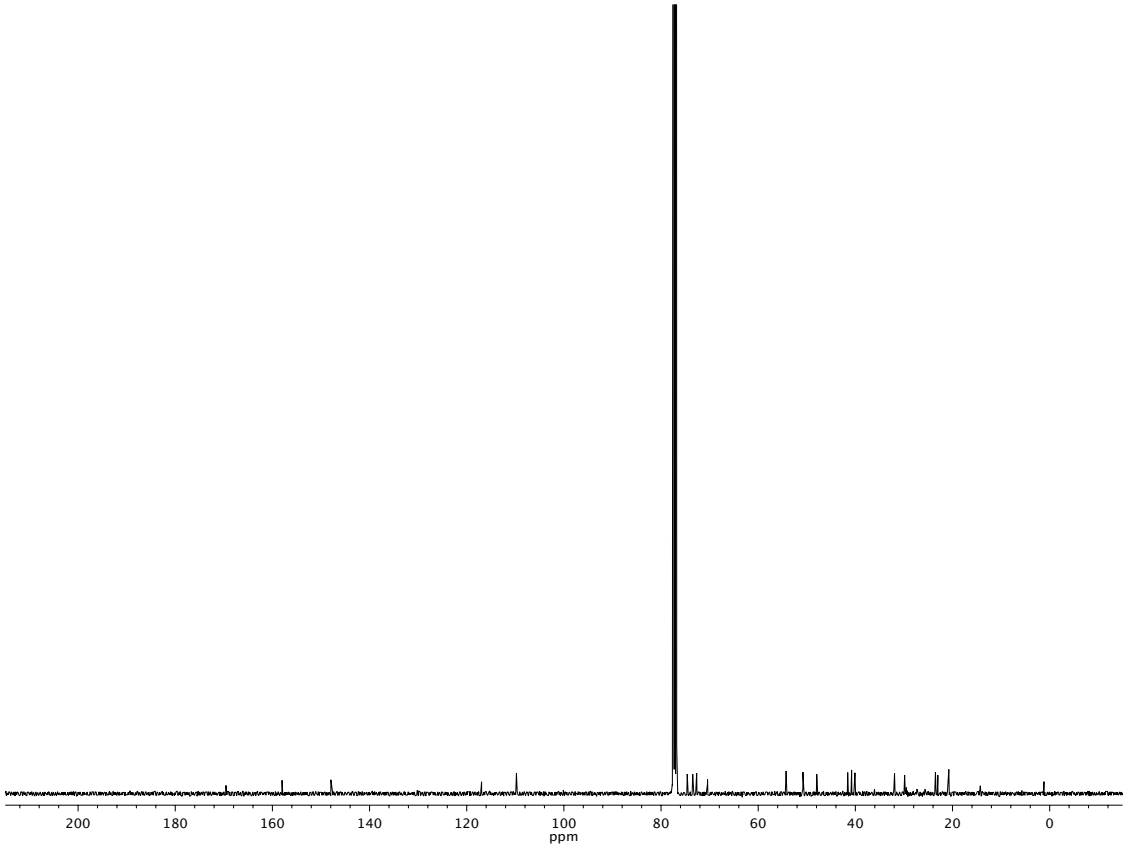
^{13}C NMR (101 MHz, $CDCl_3$) of compound **31**.



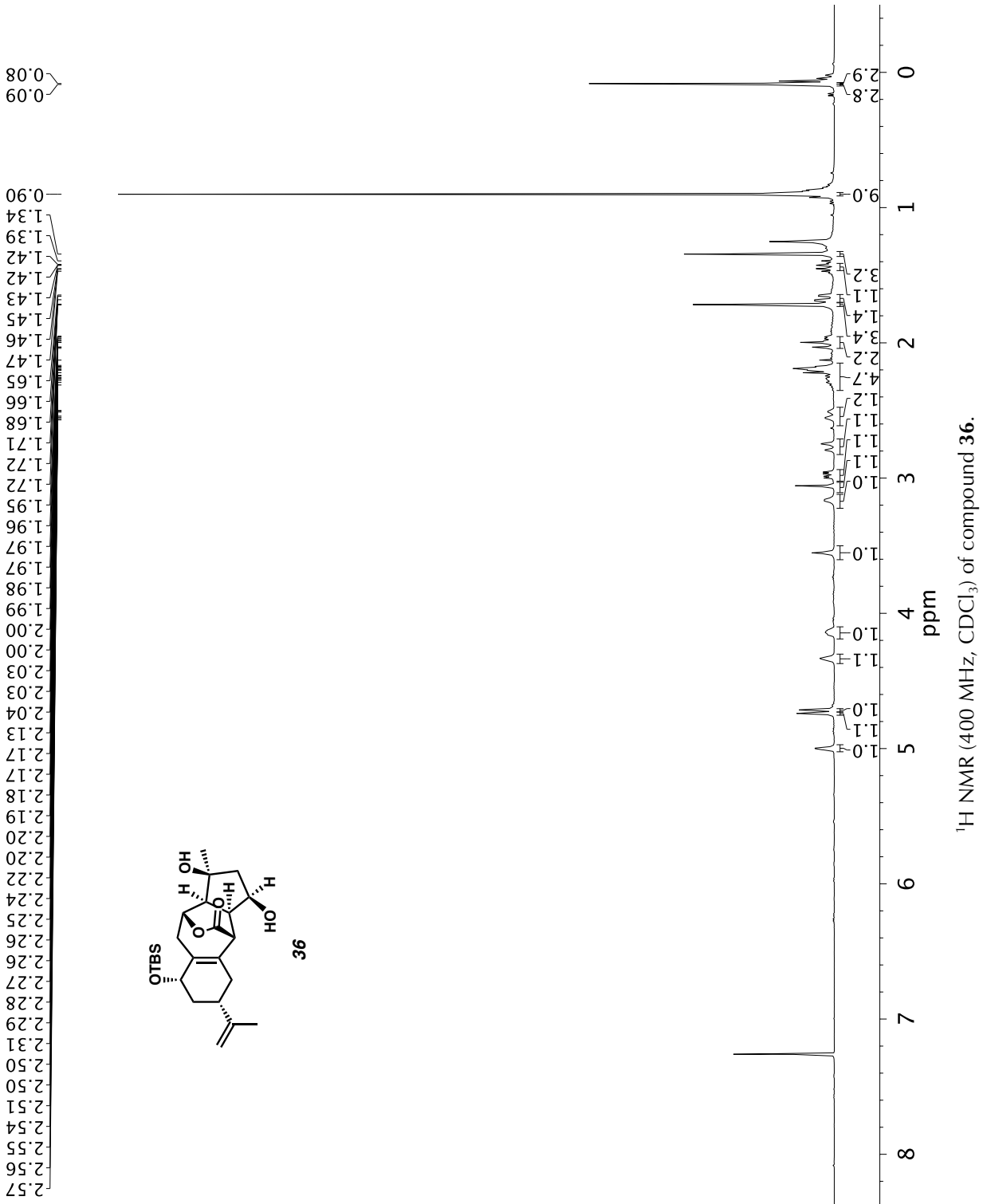
^{1}H NMR (400 MHz, $CDCl_3$) of compound **32**.



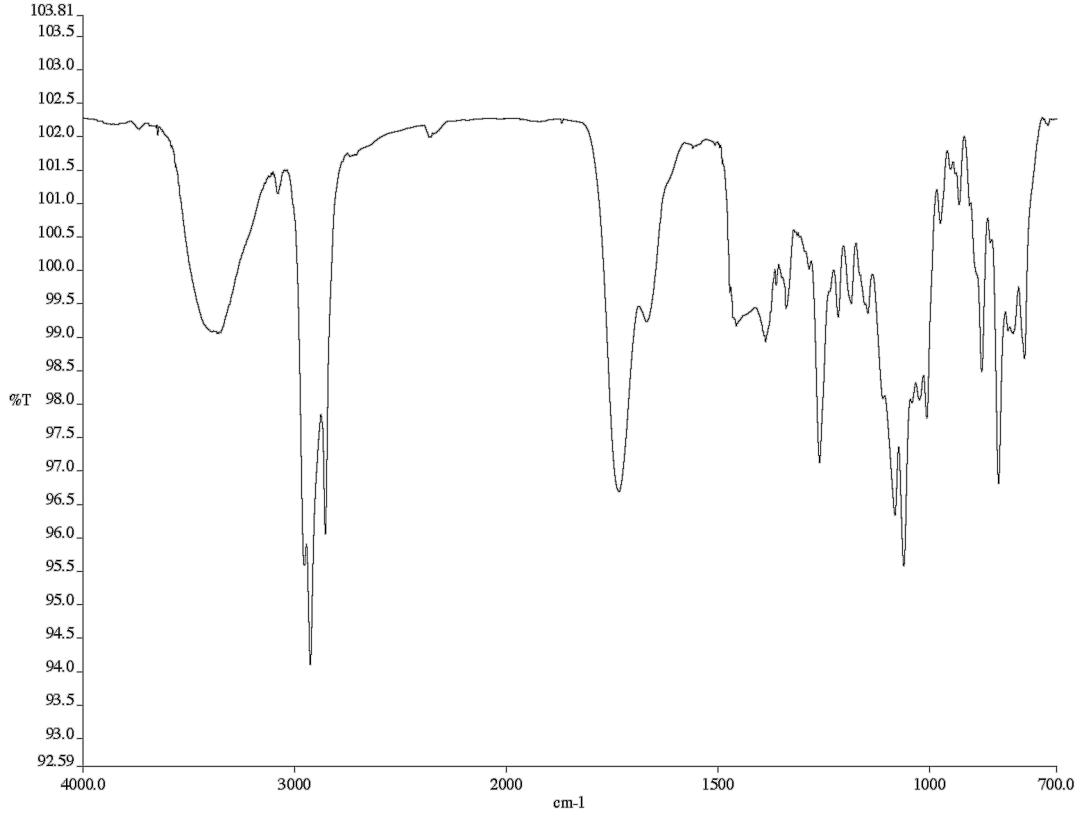
Infrared spectrum (Thin Film, NaCl) of compound **32**.



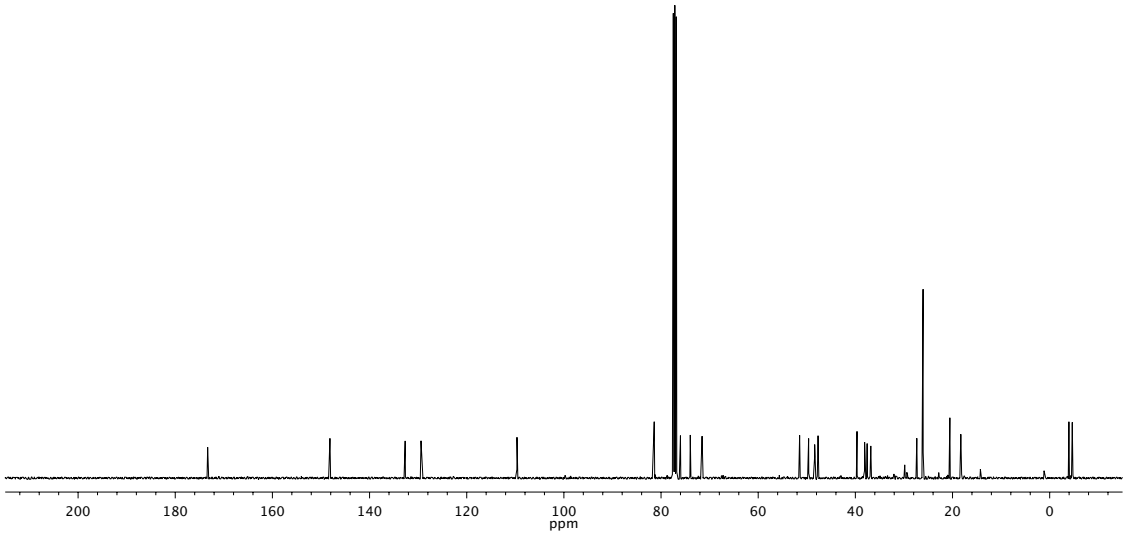
^{13}C NMR (101 MHz, $CDCl_3$) of compound **32**.



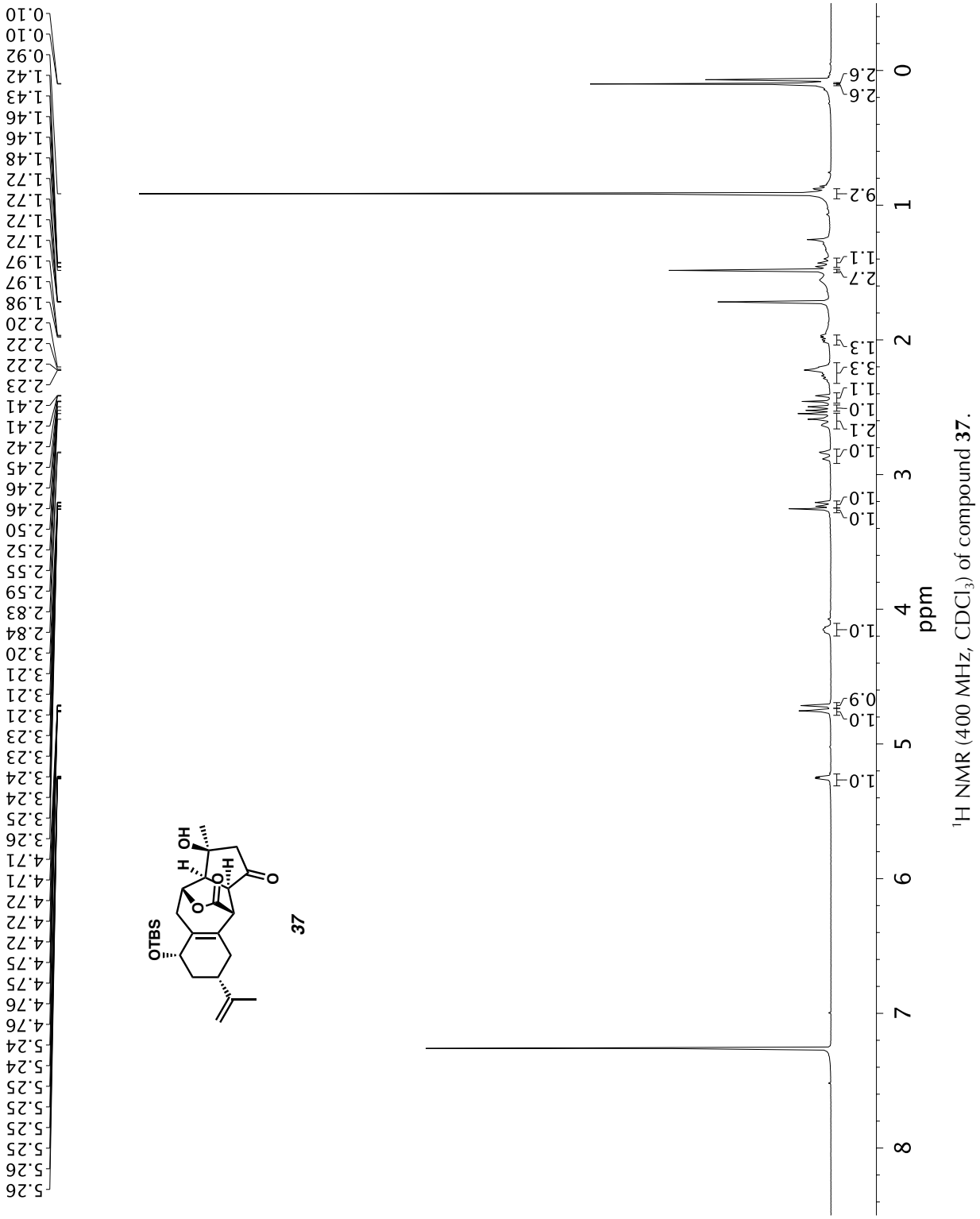
^{1}H NMR (400 MHz, $CDCl_3$) of compound **36**.



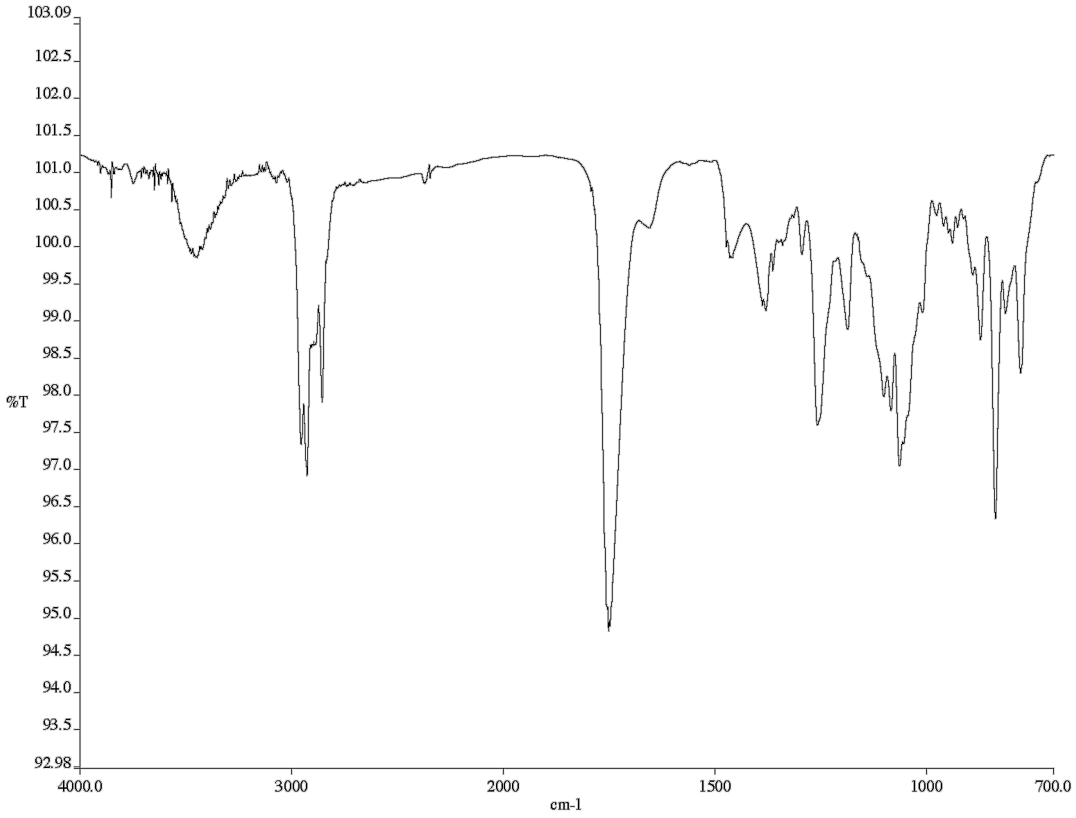
Infrared spectrum (Thin Film, NaCl) of compound **36**.



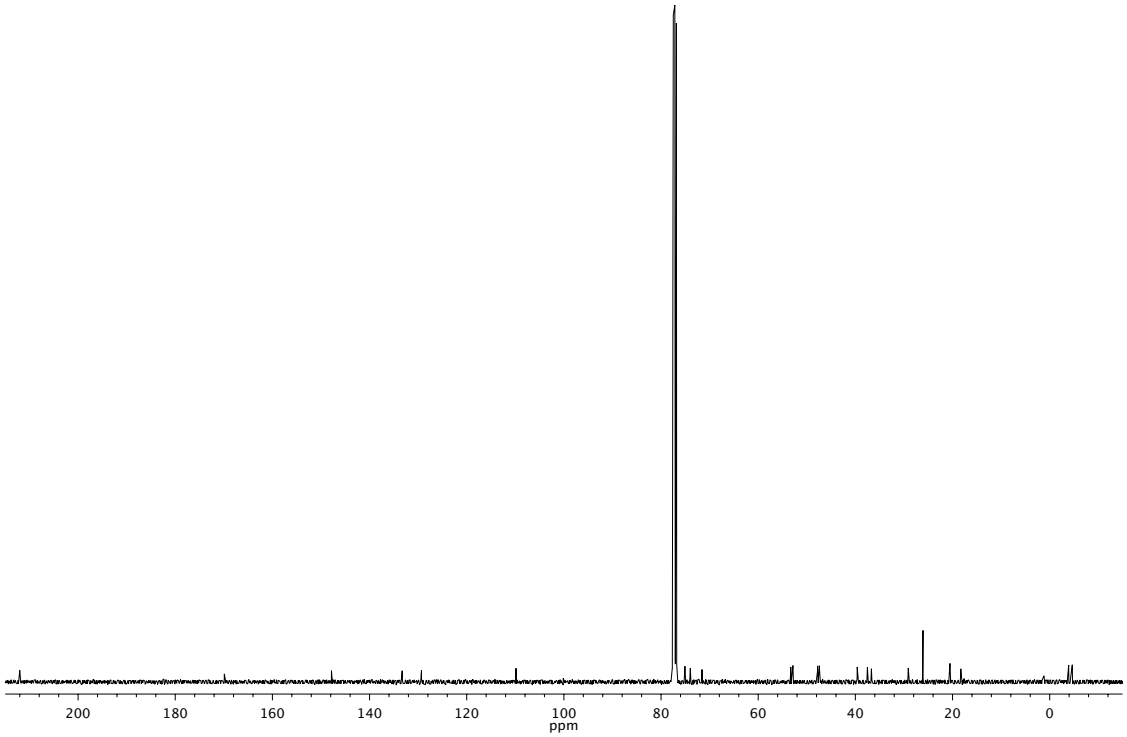
^{13}C NMR (101 MHz, $CDCl_3$) of compound **36**.



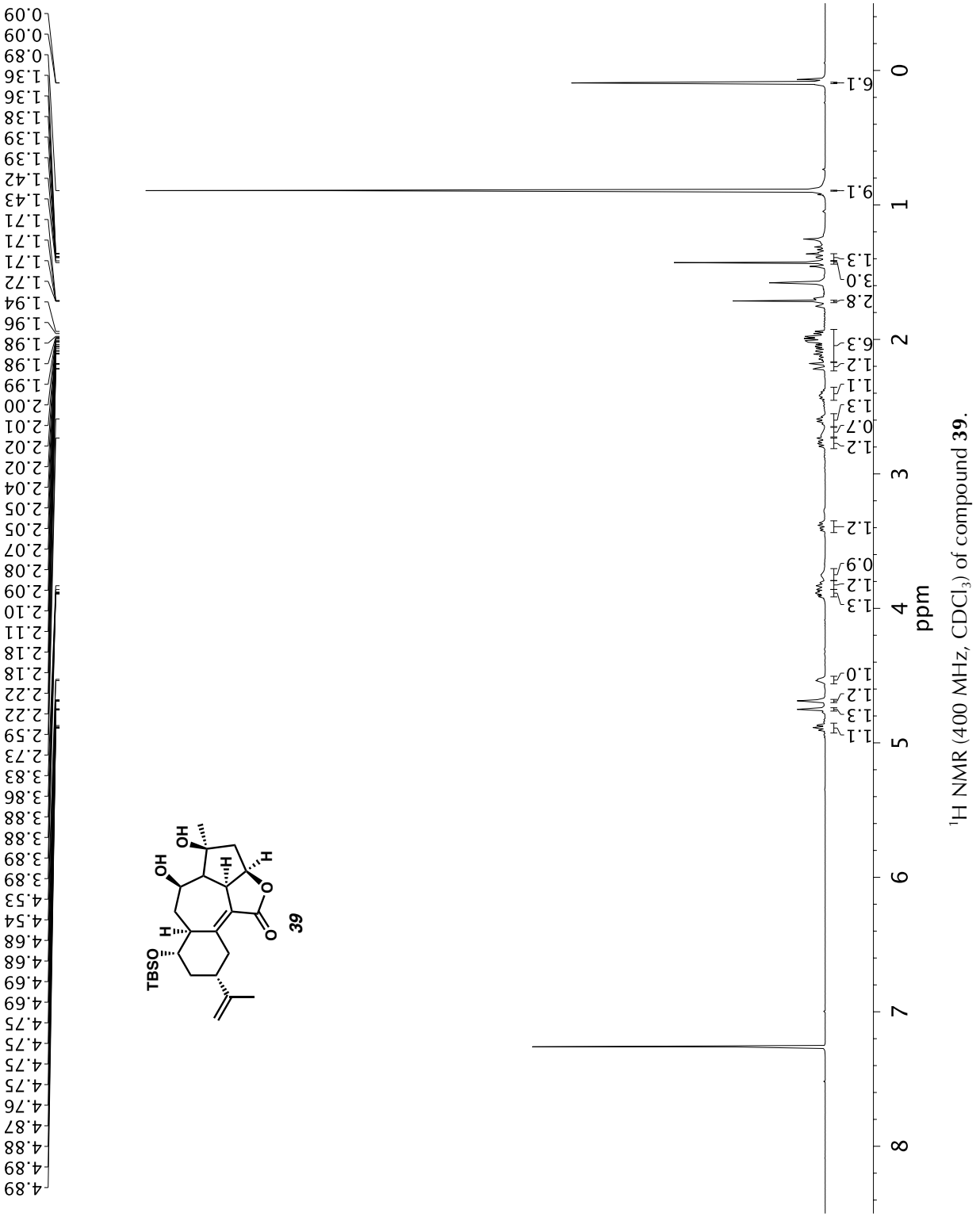
^{1}H NMR (400 MHz, $CDCl_3$) of compound **37**.



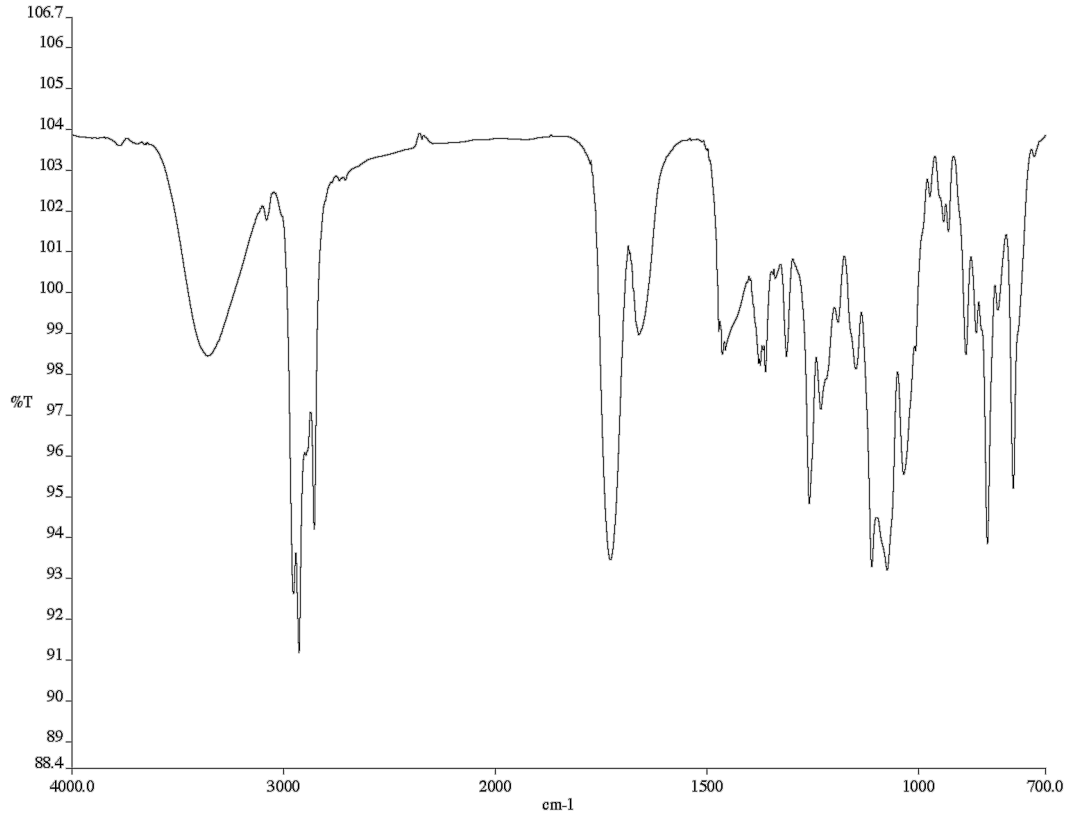
Infrared spectrum (Thin Film, NaCl) of compound **37**.



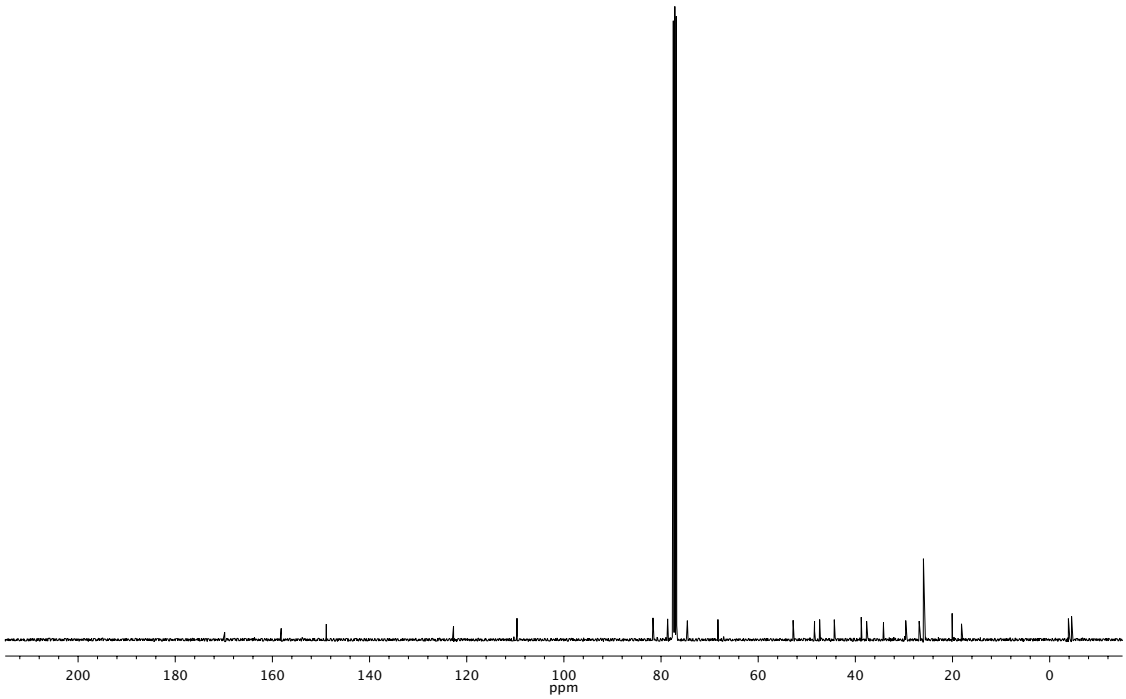
^{13}C NMR (101 MHz, $CDCl_3$) of compound **37**.



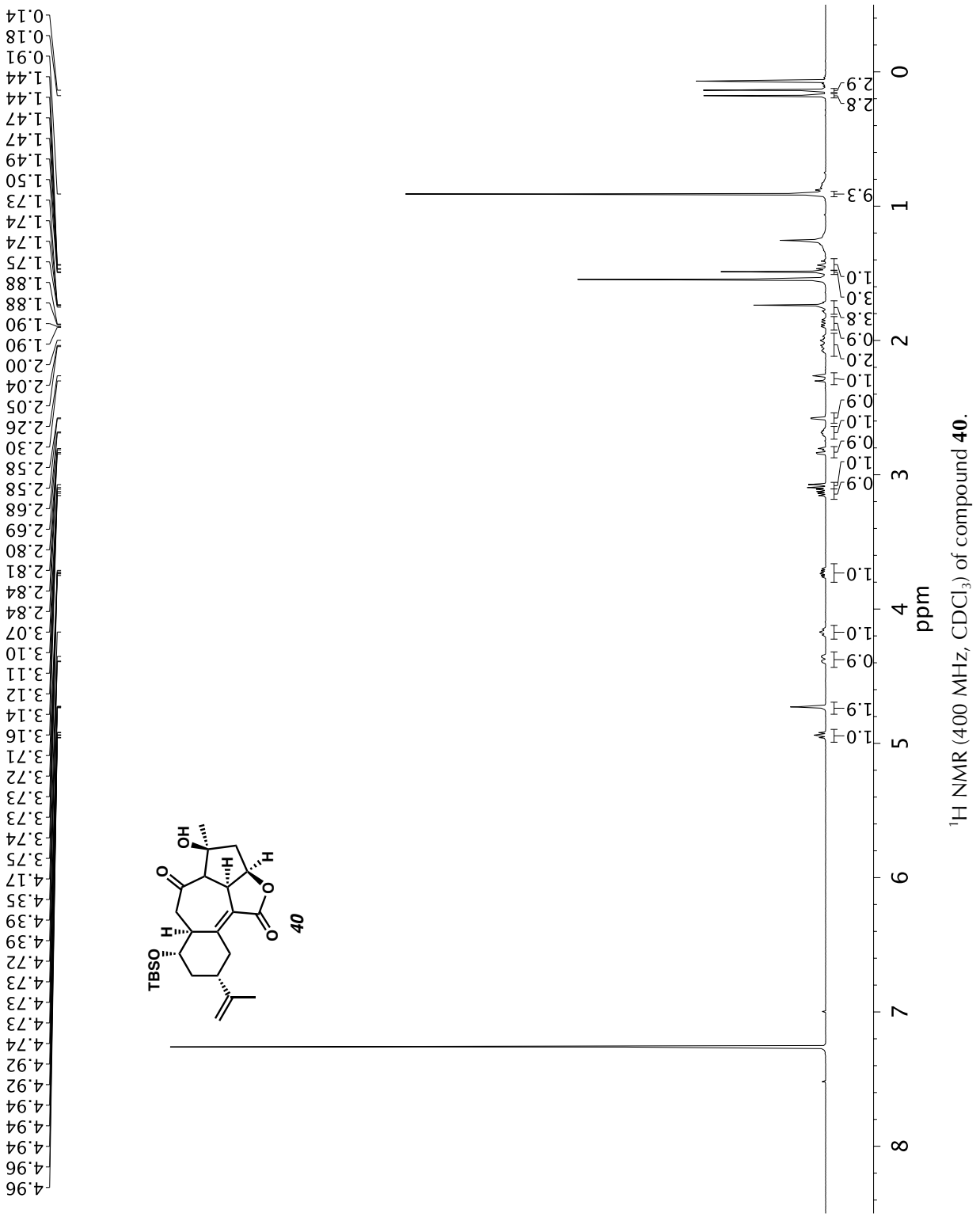
^{1}H NMR (400 MHz, $CDCl_3$) of compound **39**.



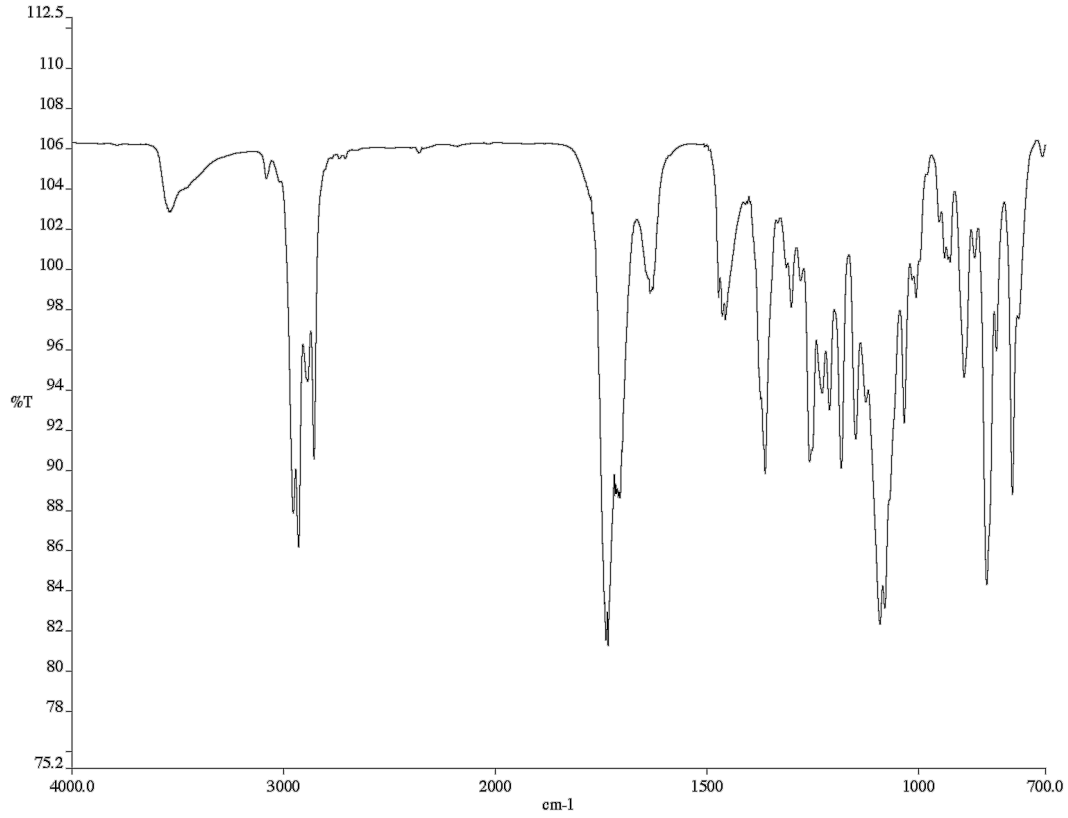
Infrared spectrum (Thin Film, NaCl) of compound **39**.



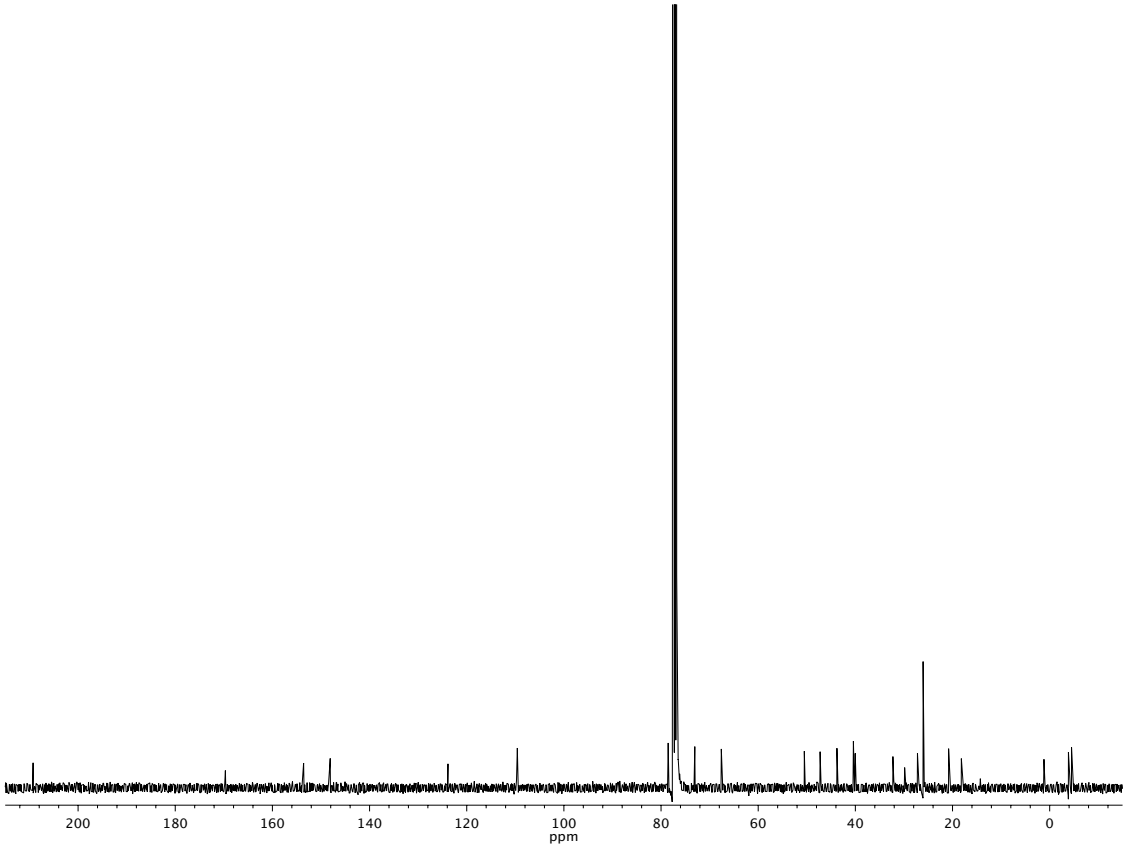
^{13}C NMR (101 MHz, $CDCl_3$) of compound **39**.



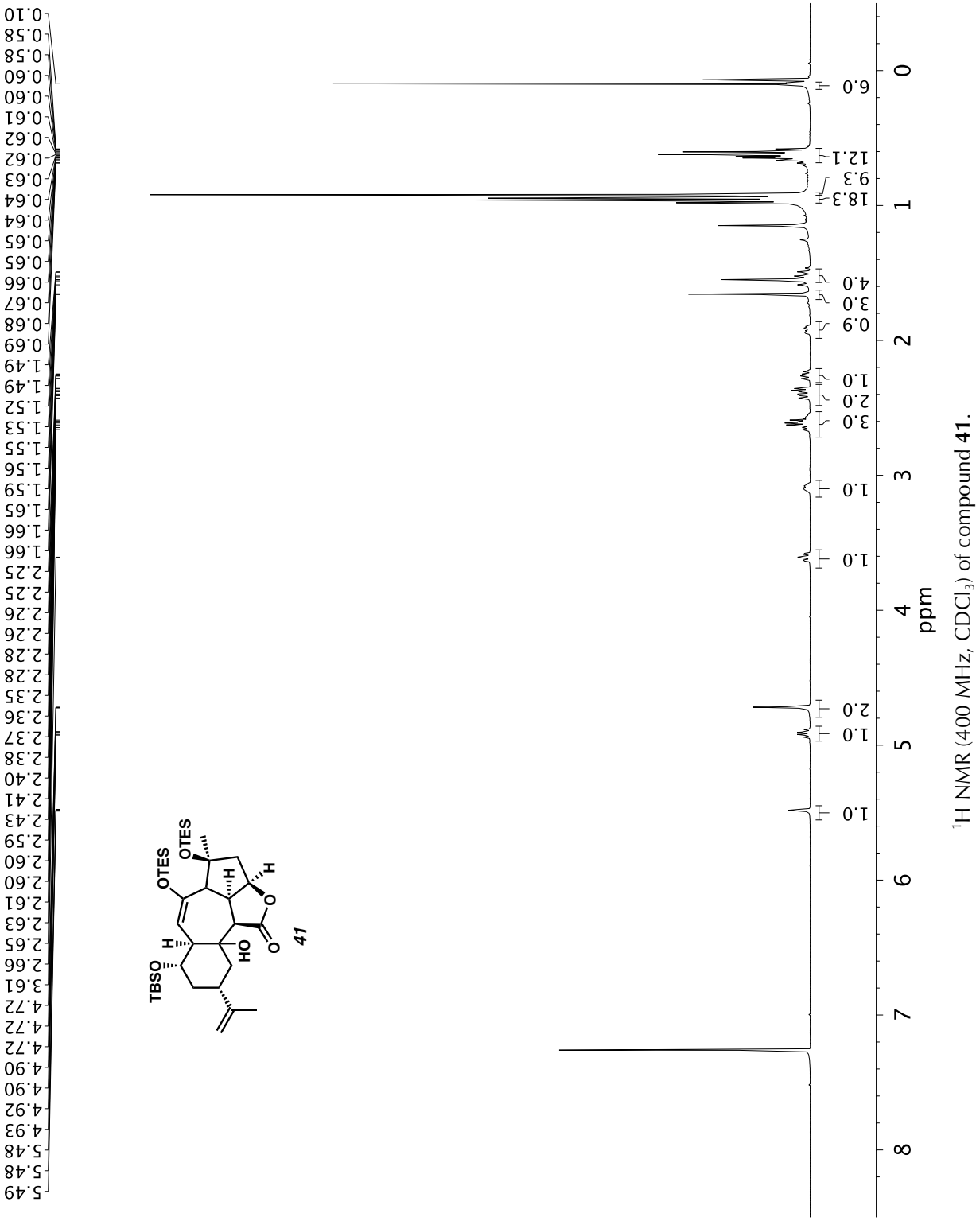
^{1}H NMR (400 MHz, $CDCl_3$) of compound **40**.



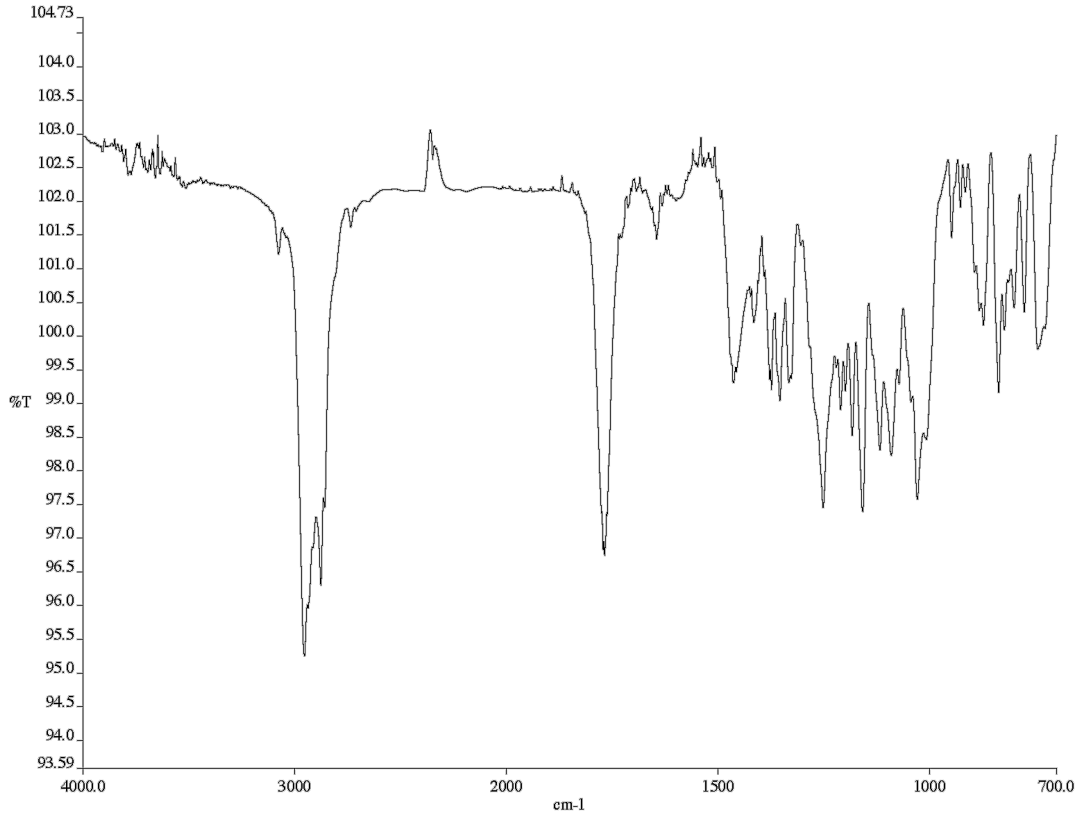
Infrared spectrum (Thin Film, NaCl) of compound **40**.



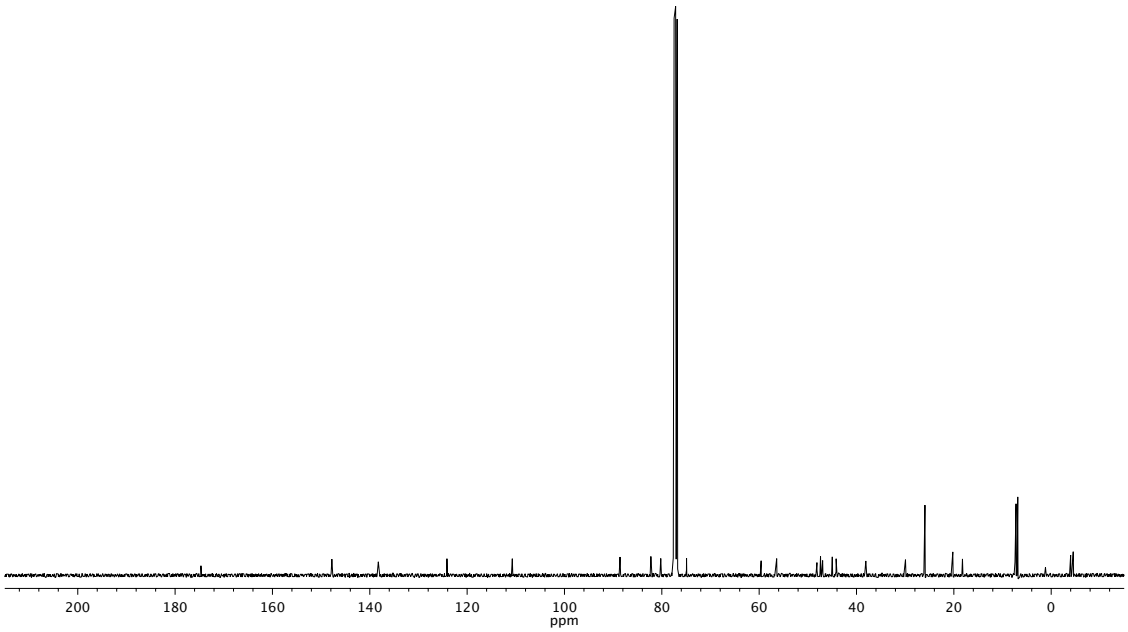
^{13}C NMR (101 MHz, $CDCl_3$) of compound **40**.



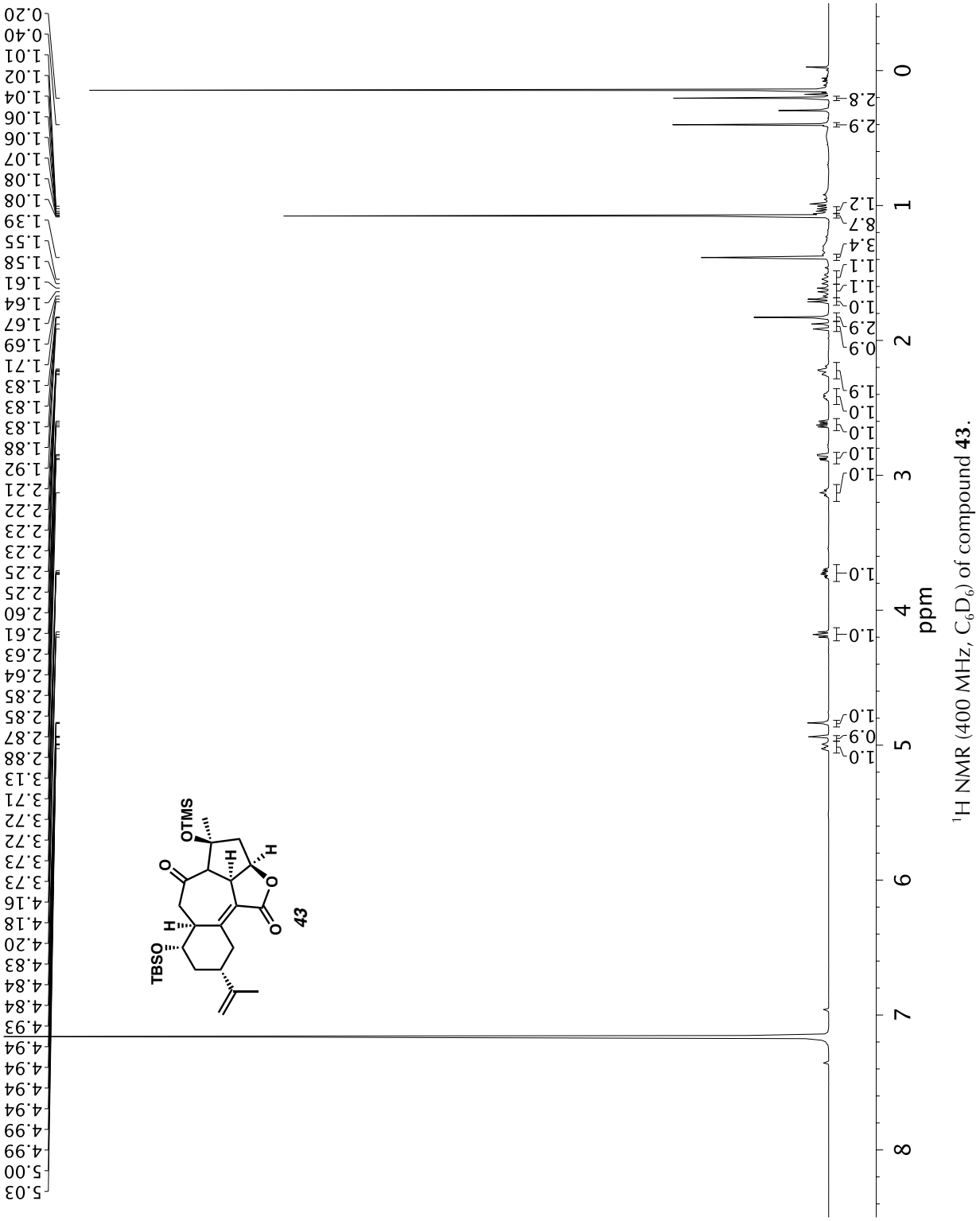
^{1}H NMR (400 MHz, $CDCl_3$) of compound **41**.



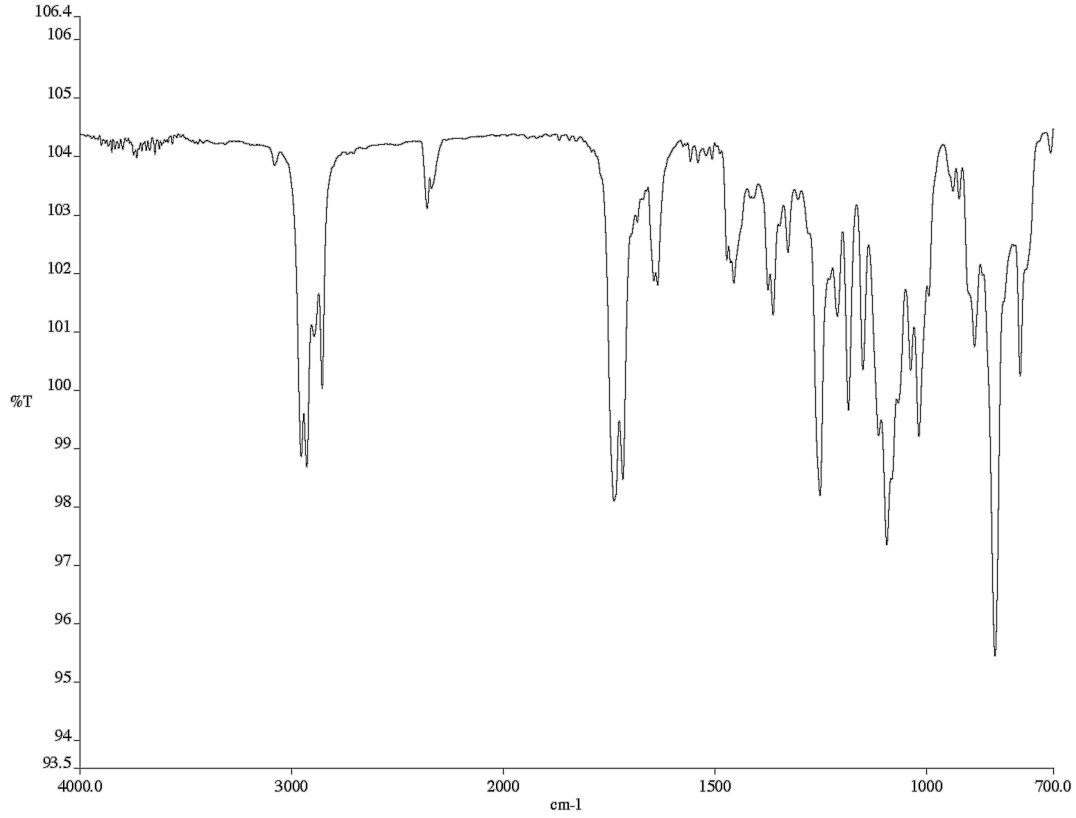
Infrared spectrum (Thin Film, NaCl) of compound **41**.



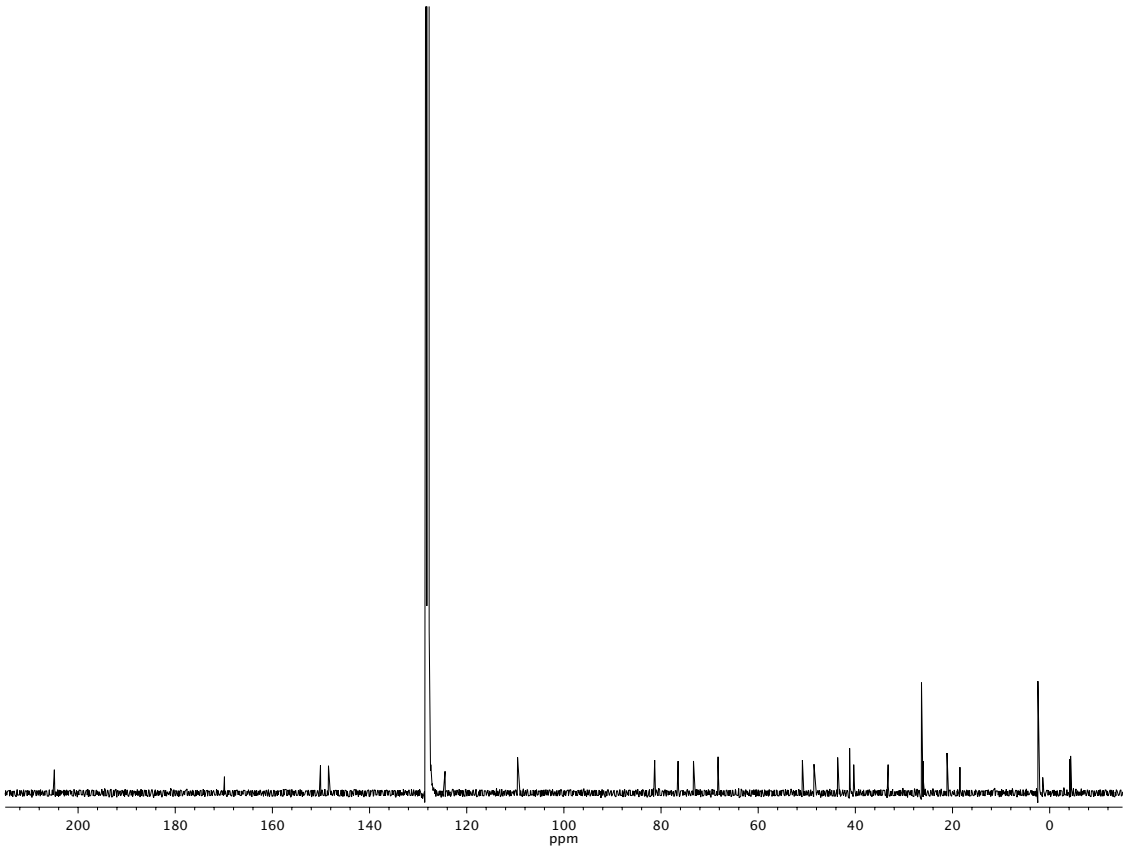
^{13}C NMR (101 MHz, $CDCl_3$) of compound **41**.



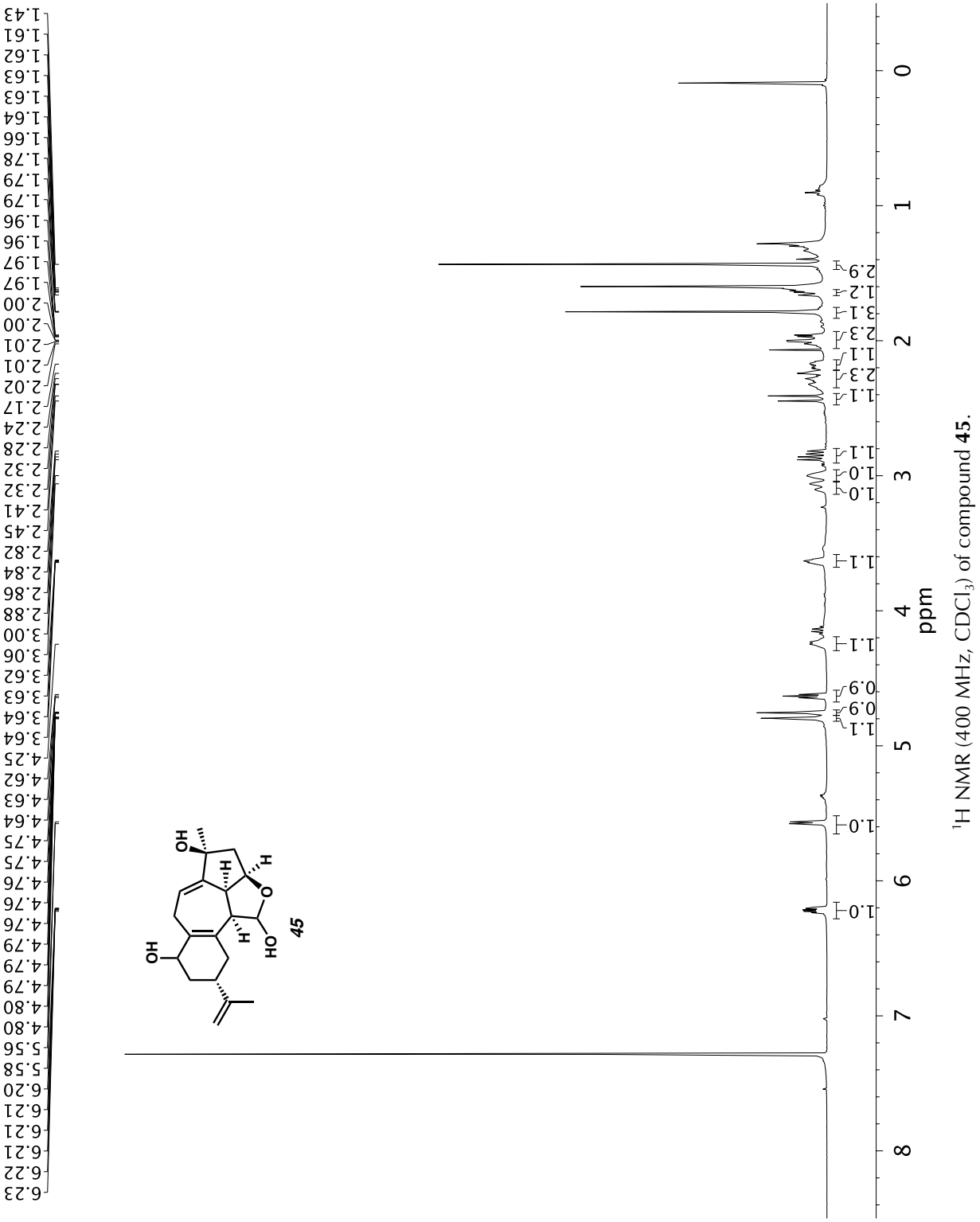
^{1}H NMR (400 MHz, C_6D_6) of compound **43**.



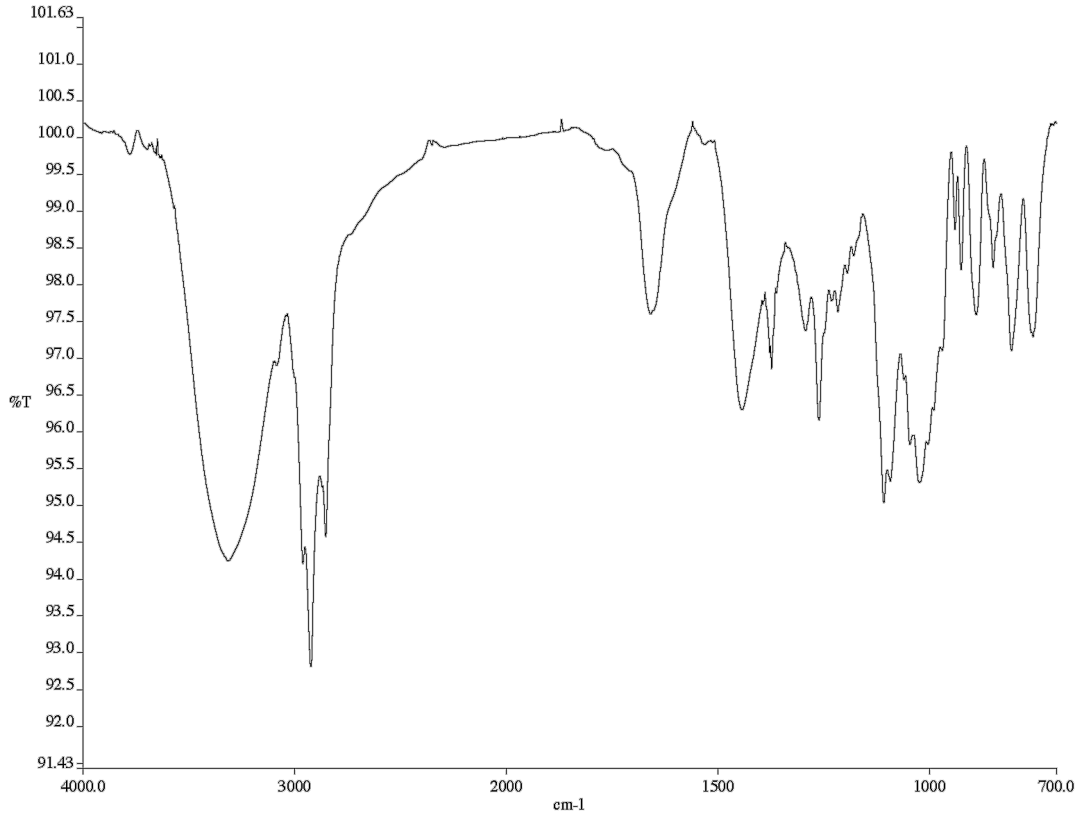
Infrared spectrum (Thin Film, NaCl) of compound **43**.



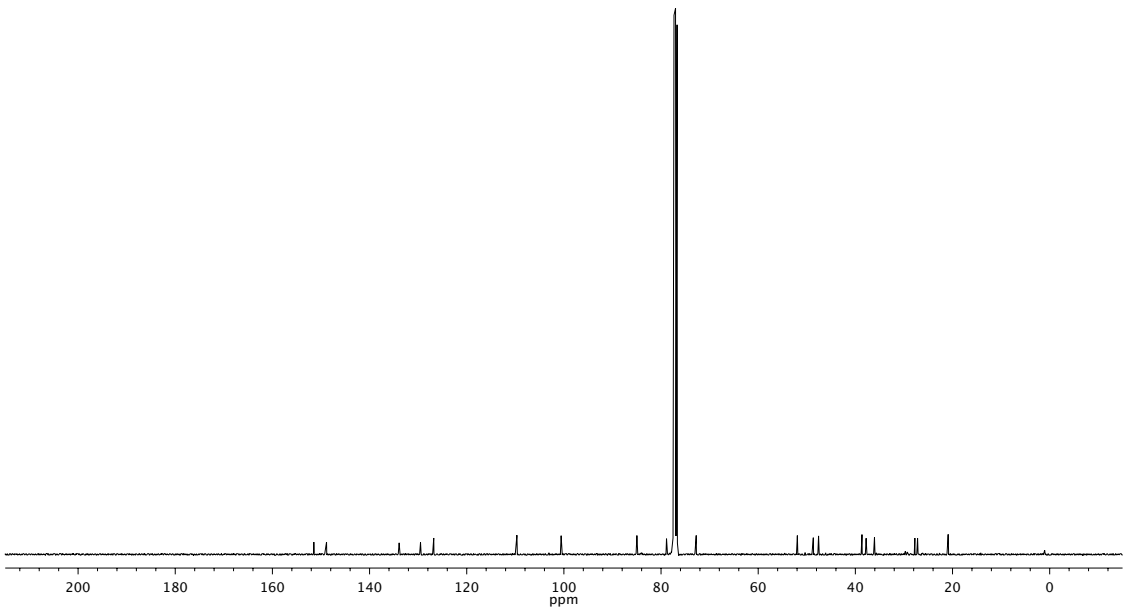
^{13}C NMR (101 MHz, C_6D_6) of compound **43**.



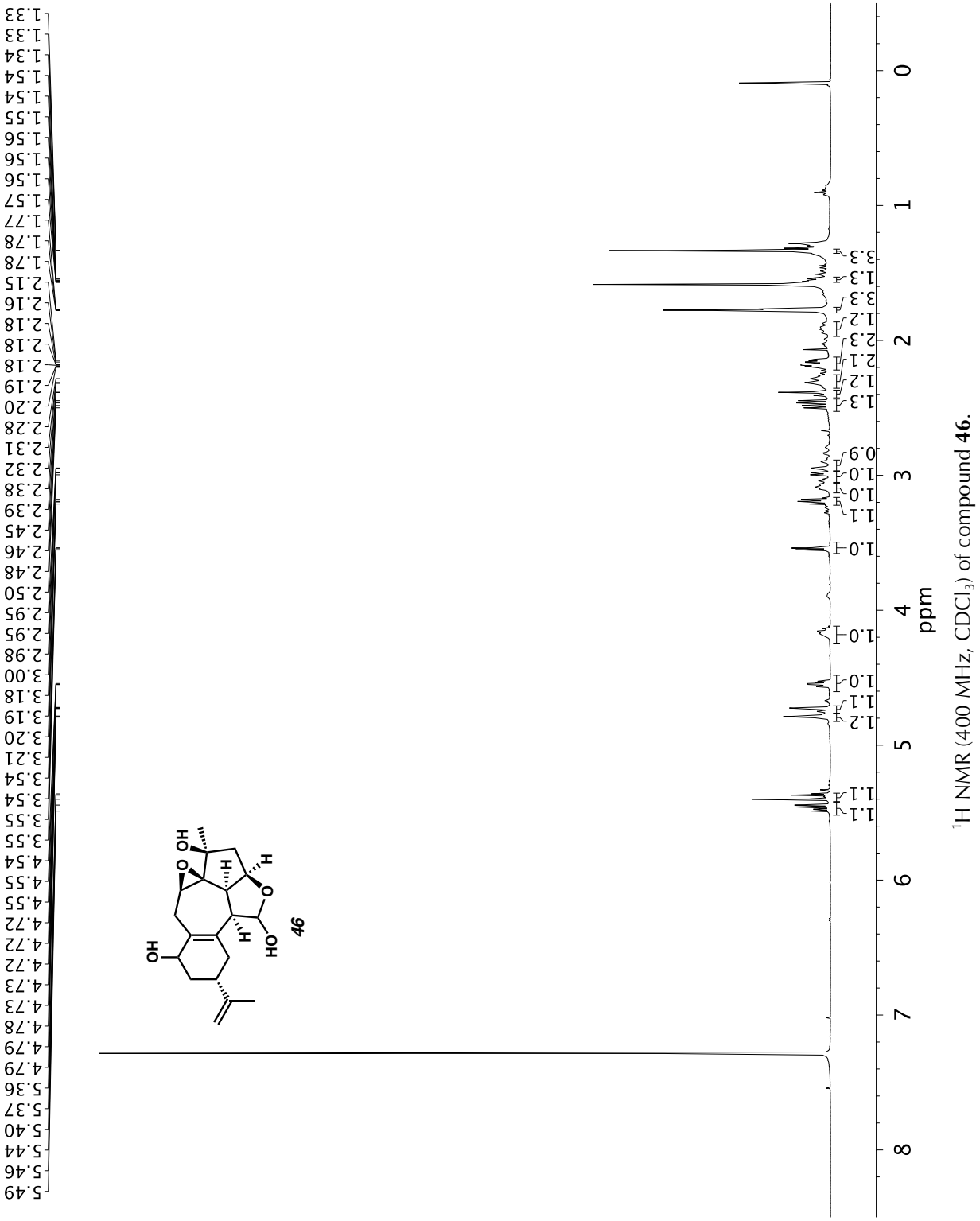
^{1}H NMR (400 MHz, $CDCl_3$) of compound **45**.



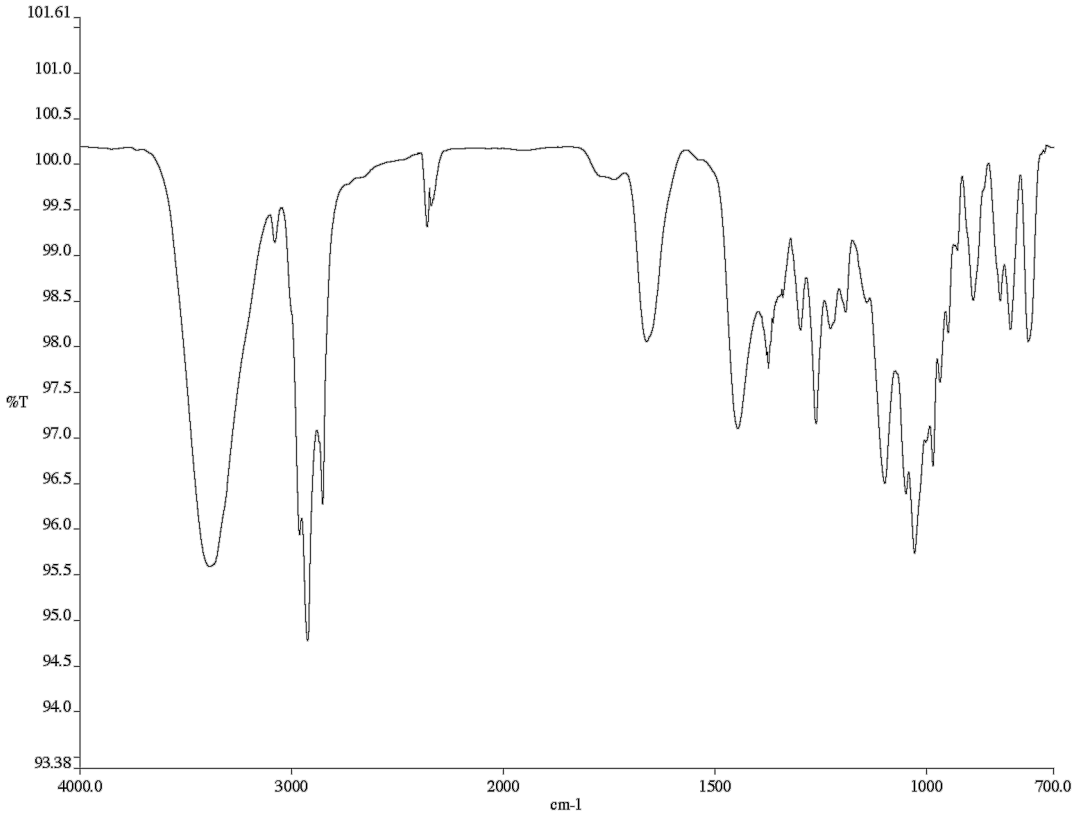
Infrared spectrum (Thin Film, NaCl) of compound **45**.



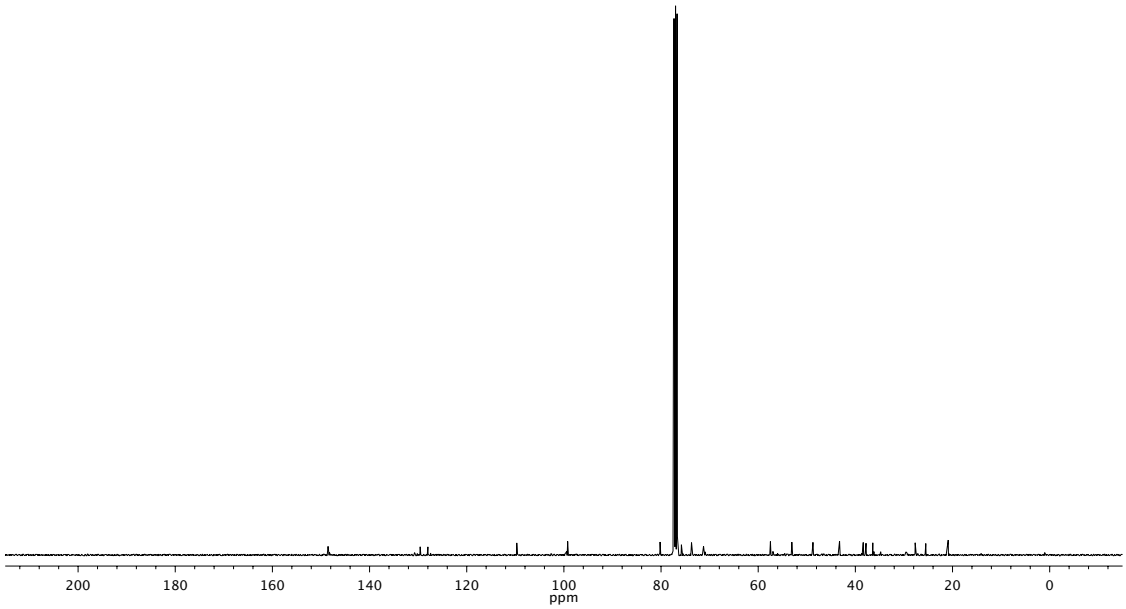
^{13}C NMR (101 MHz, $CDCl_3$) of compound **45**.



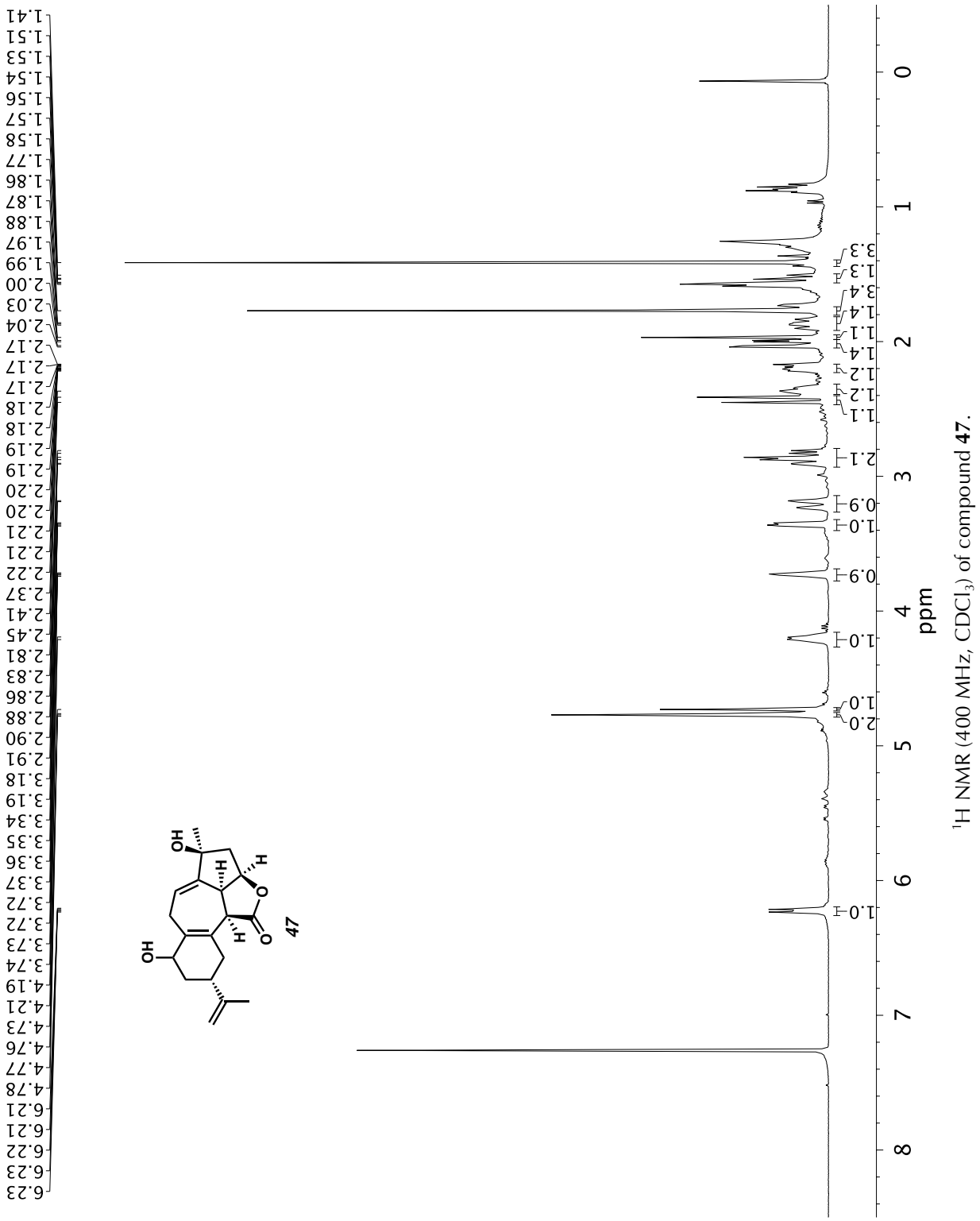
^{1}H NMR (400 MHz, $CDCl_3$) of compound **46**.



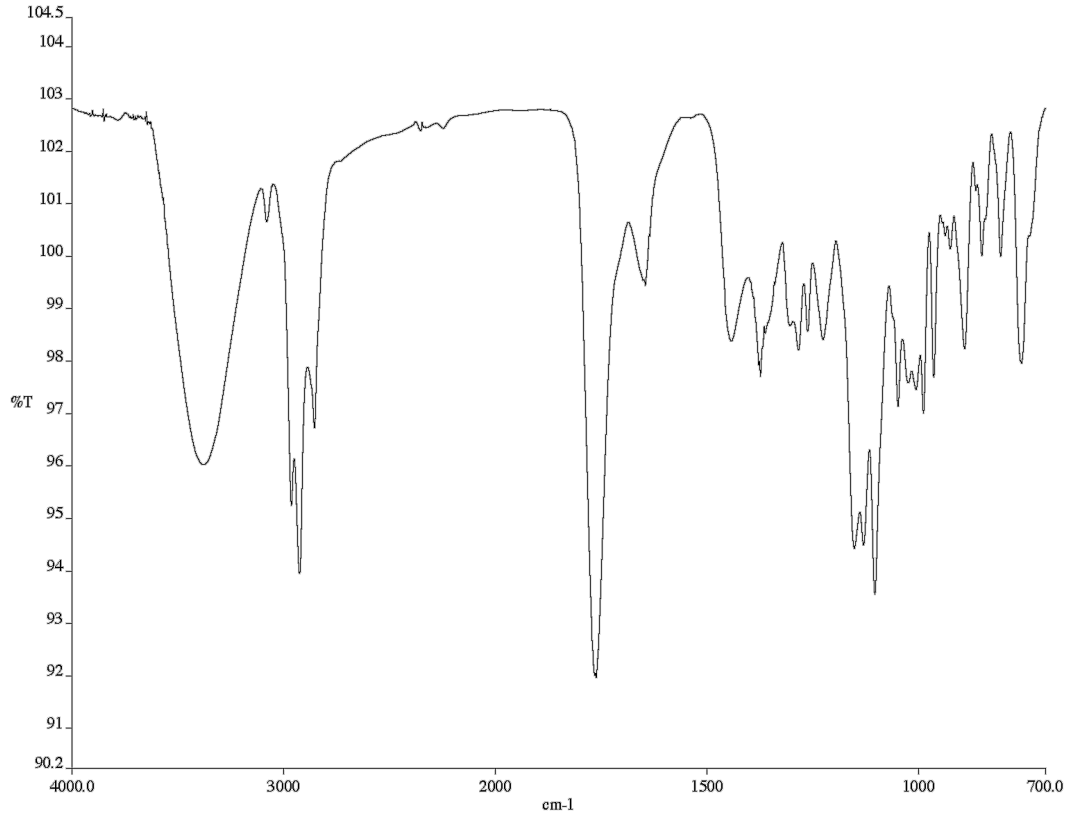
Infrared spectrum (Thin Film, NaCl) of compound **46**.



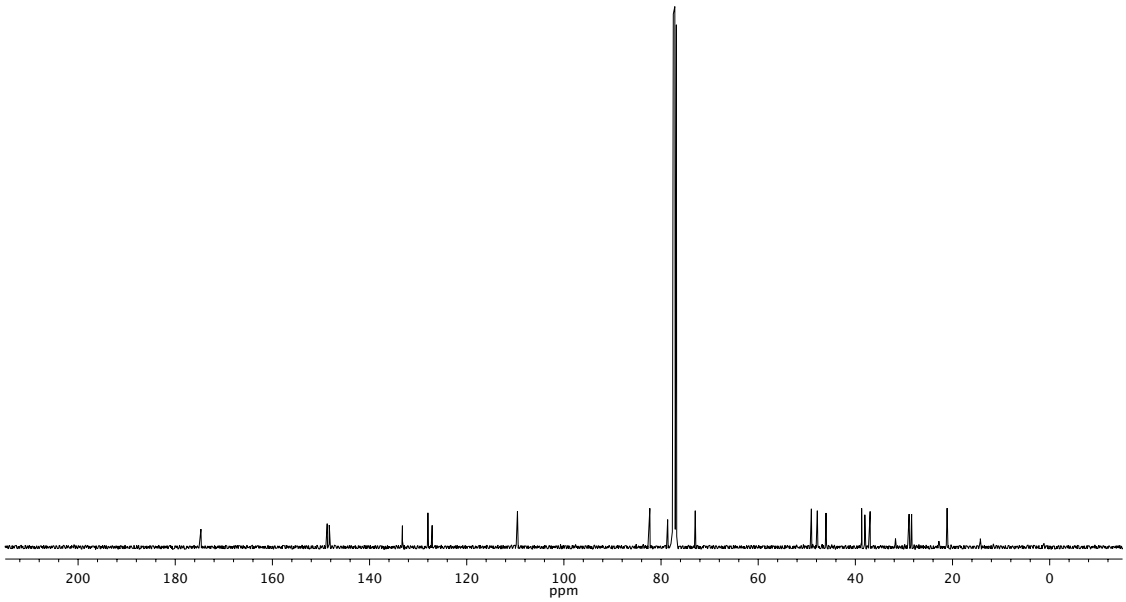
^{13}C NMR (101 MHz, $CDCl_3$) of compound **46**.



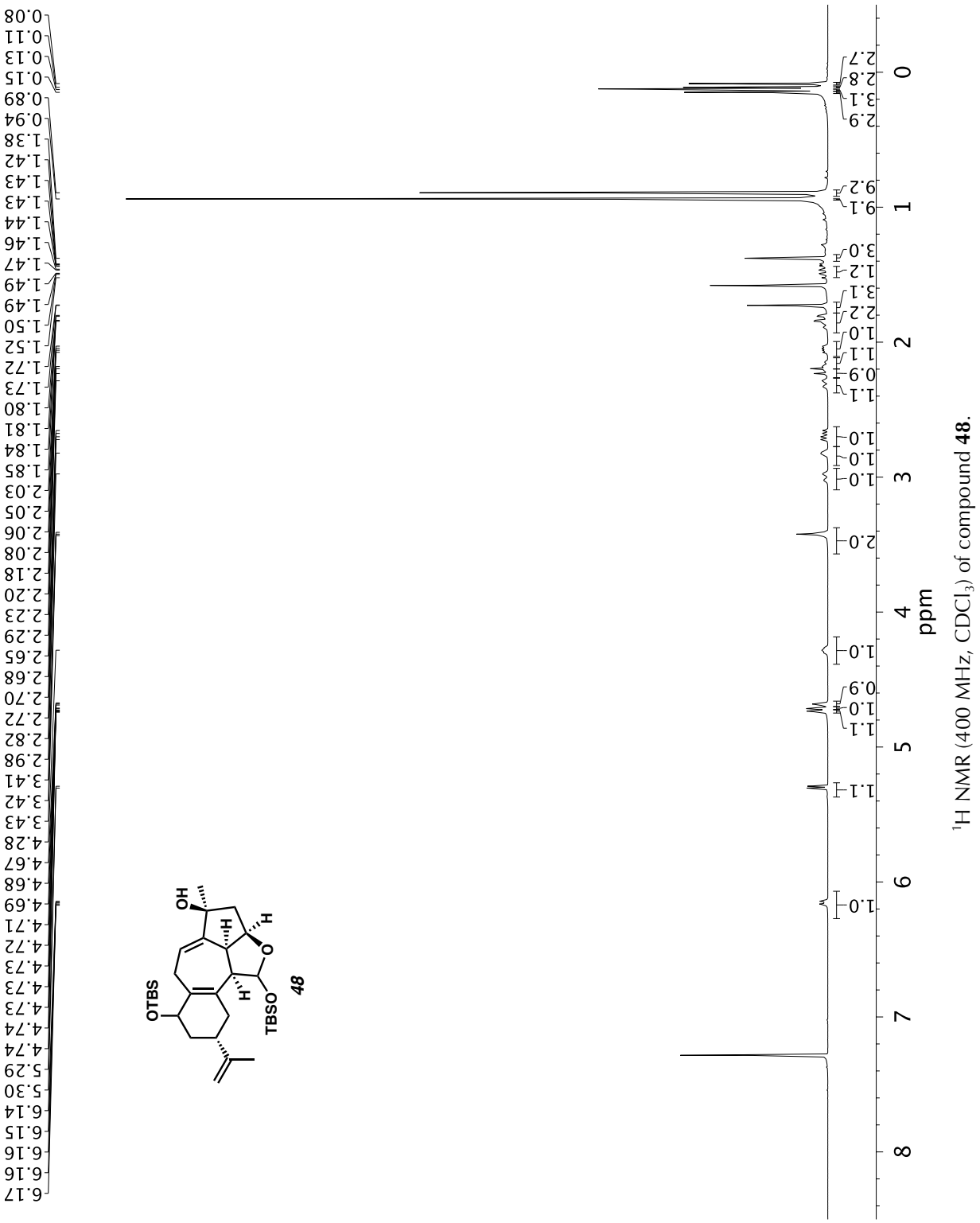
^{1}H NMR (400 MHz, $CDCl_3$) of compound **47**.



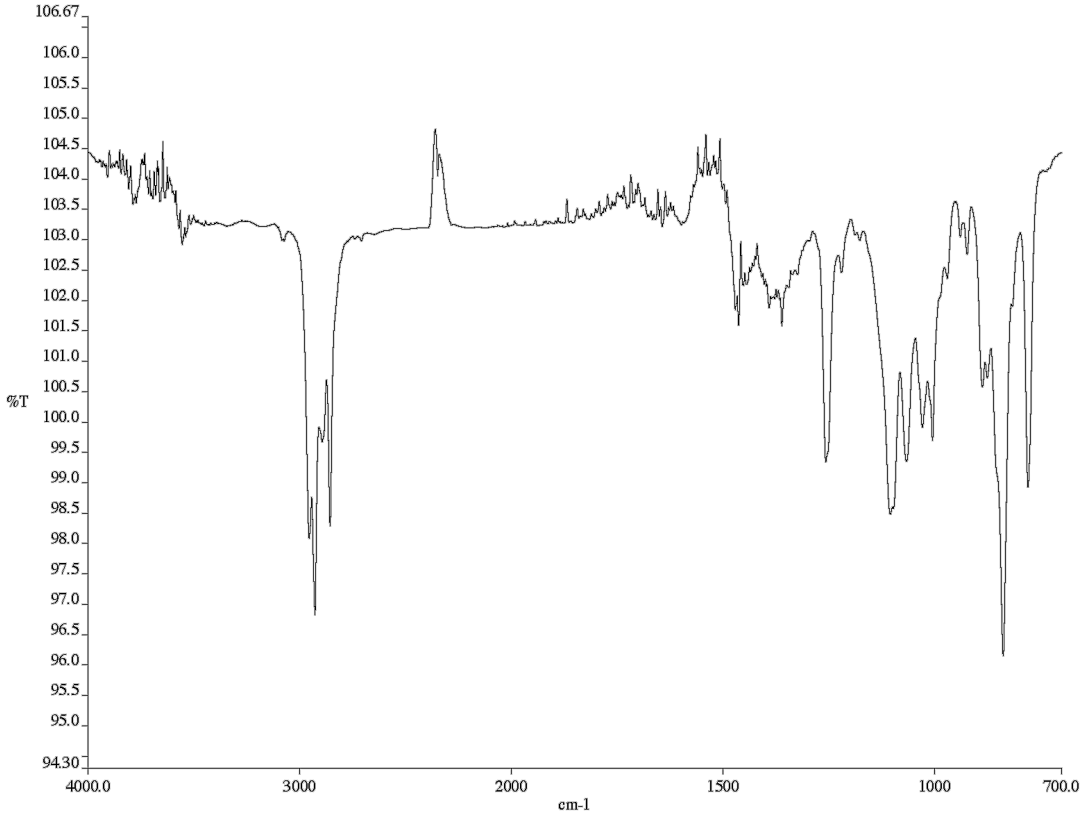
Infrared spectrum (Thin Film, NaCl) of compound **47**.



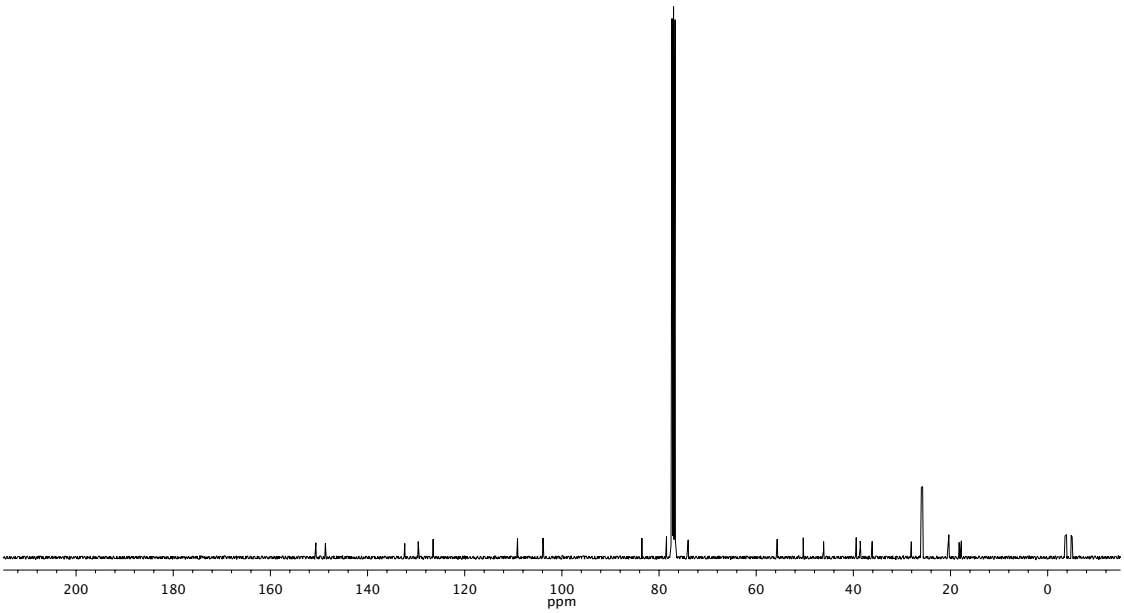
^{13}C NMR (101 MHz, $CDCl_3$) of compound **47**.



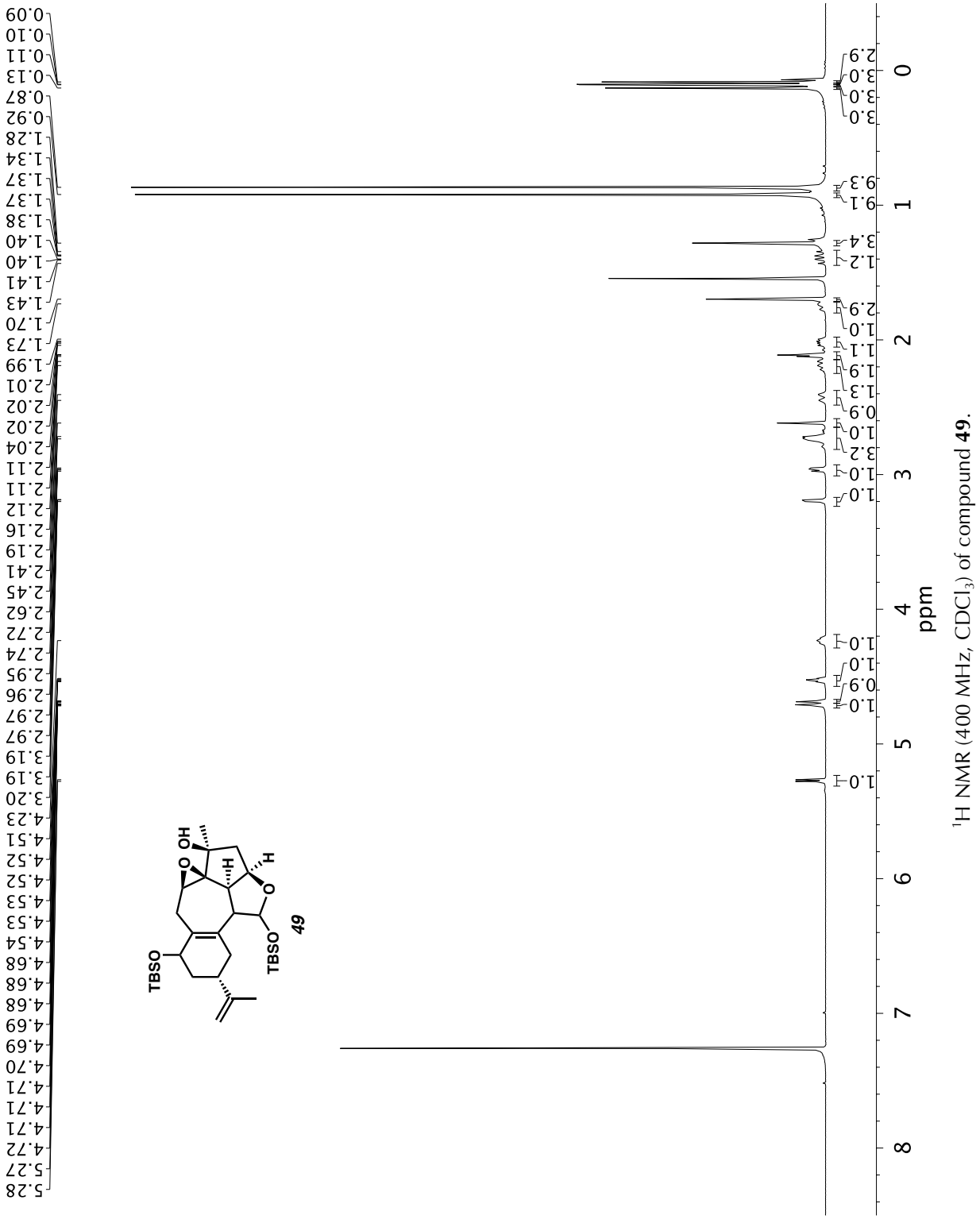
^{1}H NMR (400 MHz, $CDCl_3$) of compound **48**.



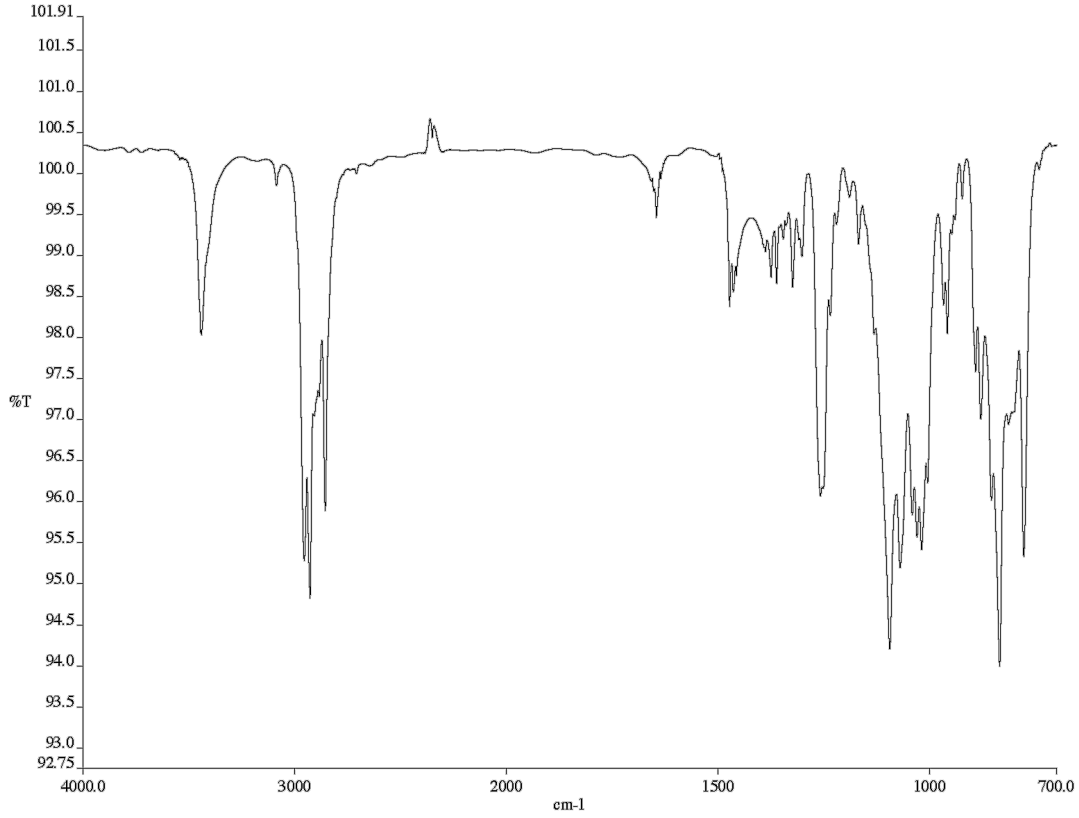
Infrared spectrum (Thin Film, NaCl) of compound **48**.



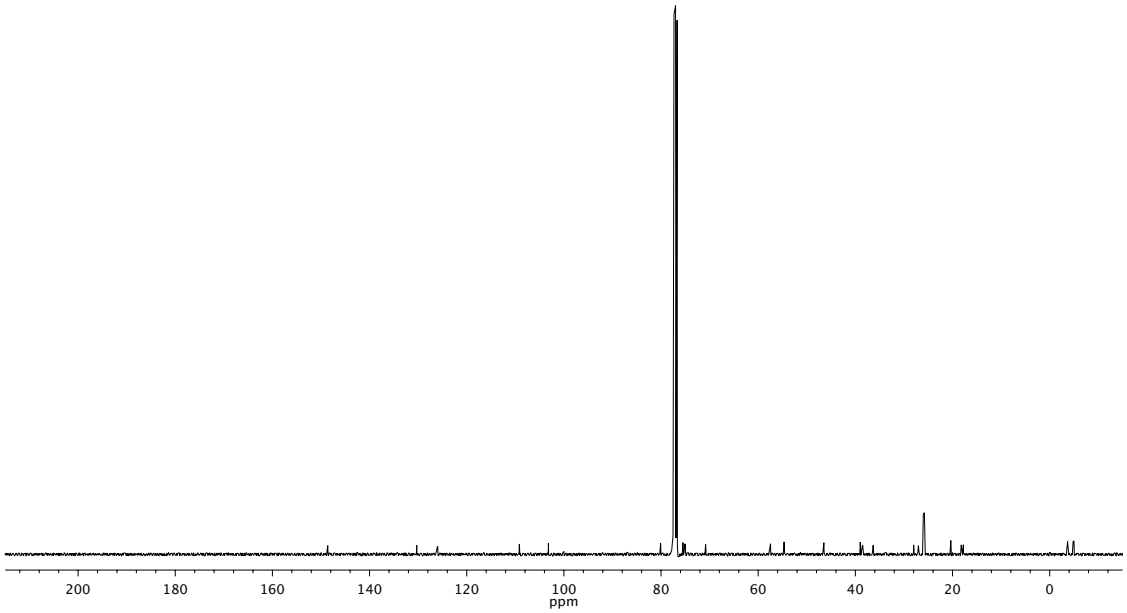
^{13}C NMR (101 MHz, $CDCl_3$) of compound **48**.



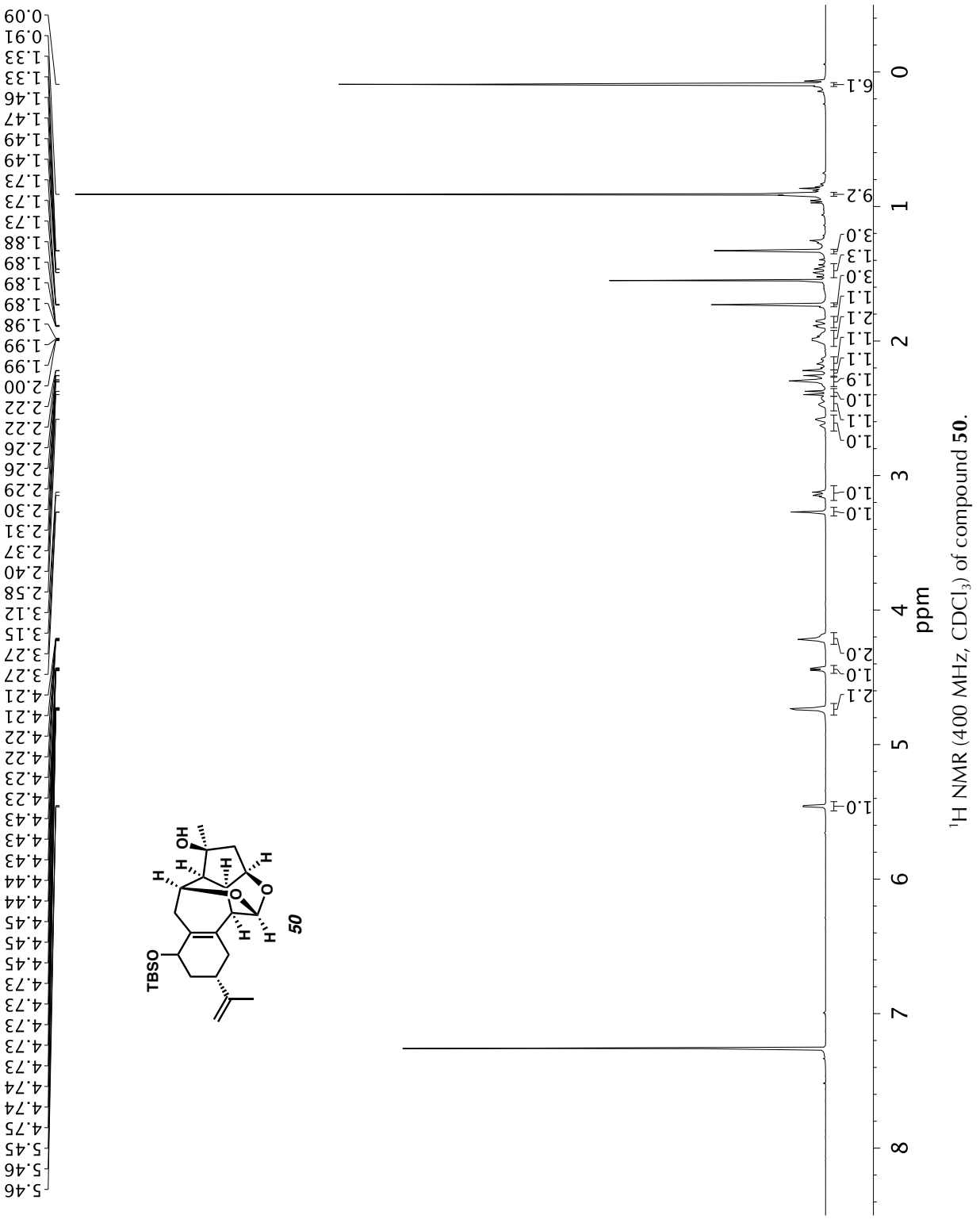
^{1}H NMR (400 MHz, $CDCl_3$) of compound **49**.



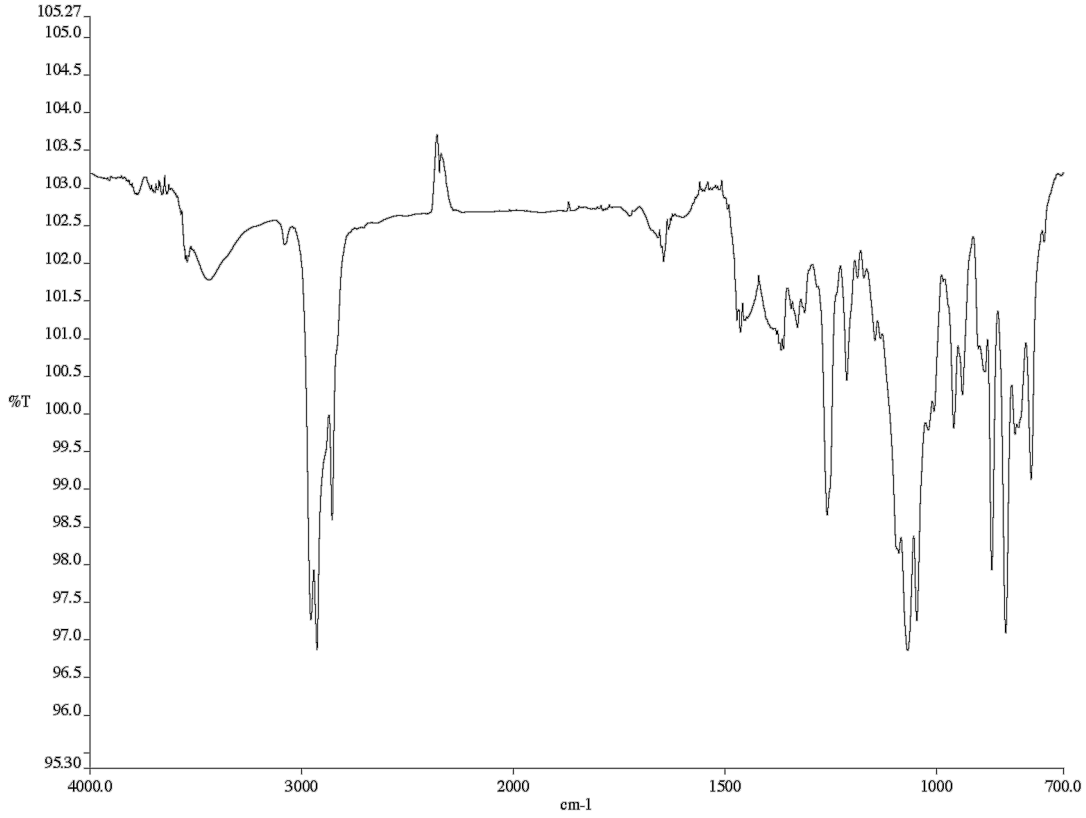
Infrared spectrum (Thin Film, NaCl) of compound **49**.



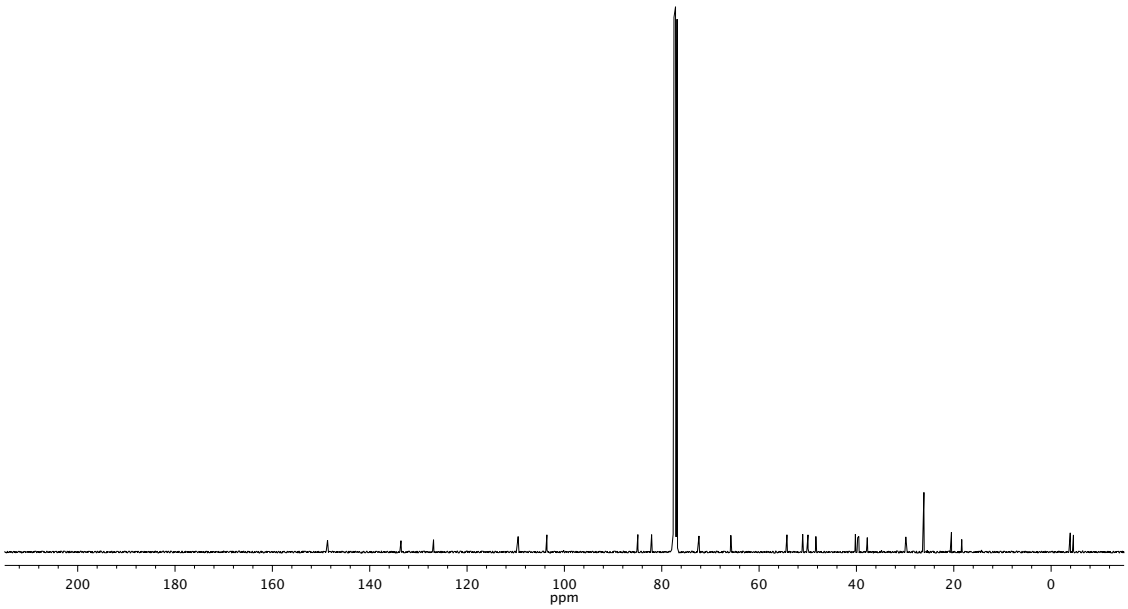
^{13}C NMR (101 MHz, $CDCl_3$) of compound **49**.



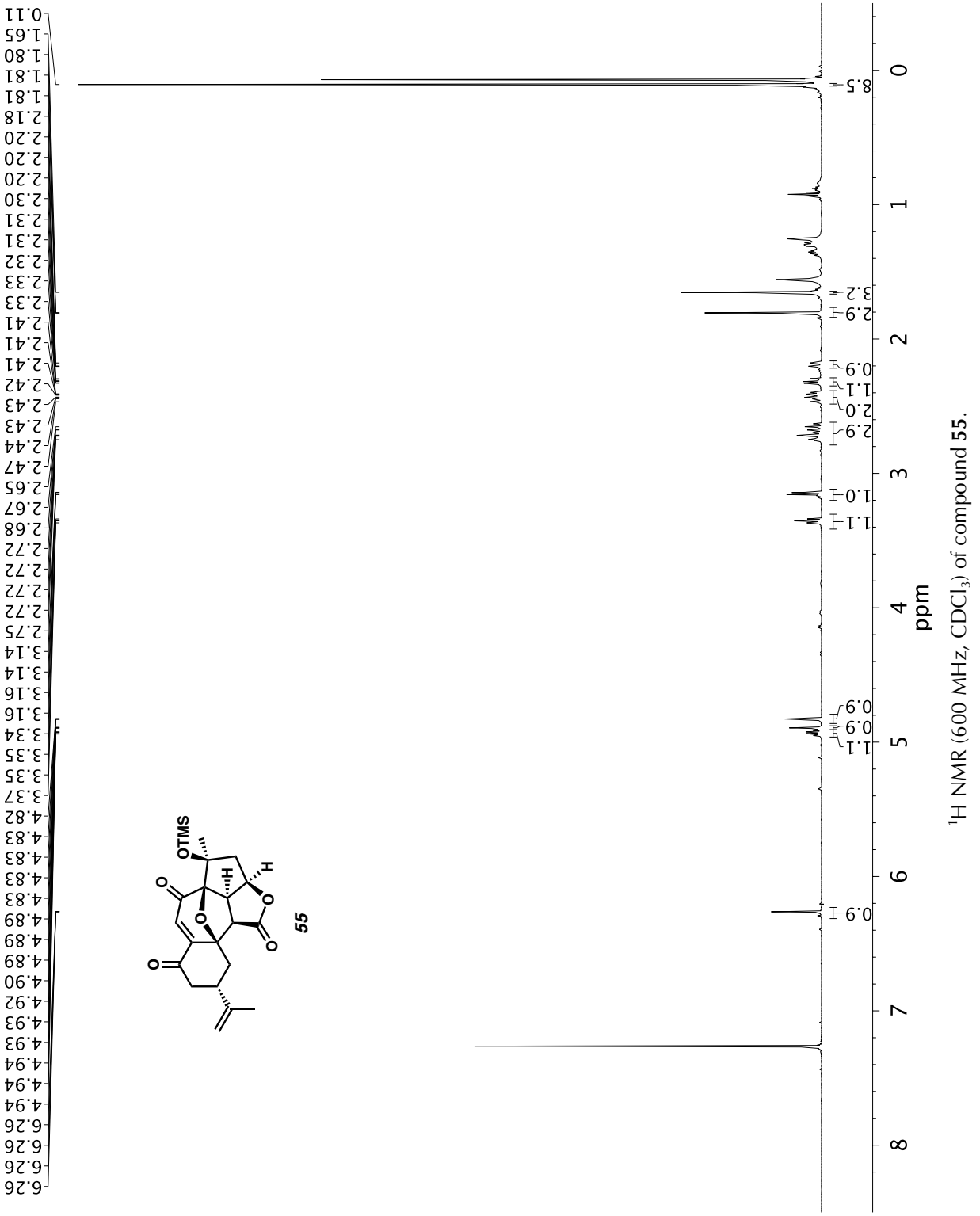
^{1}H NMR (400 MHz, $CDCl_3$) of compound **50**.



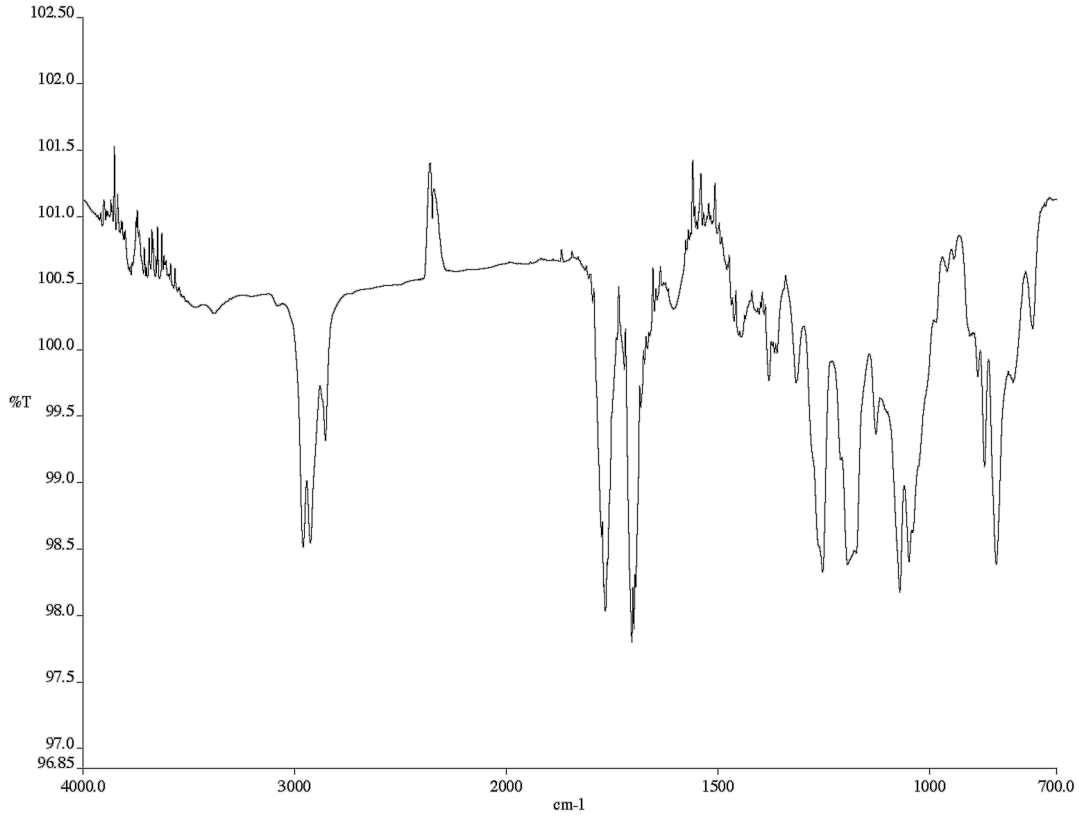
Infrared spectrum (Thin Film, NaCl) of compound **50**.



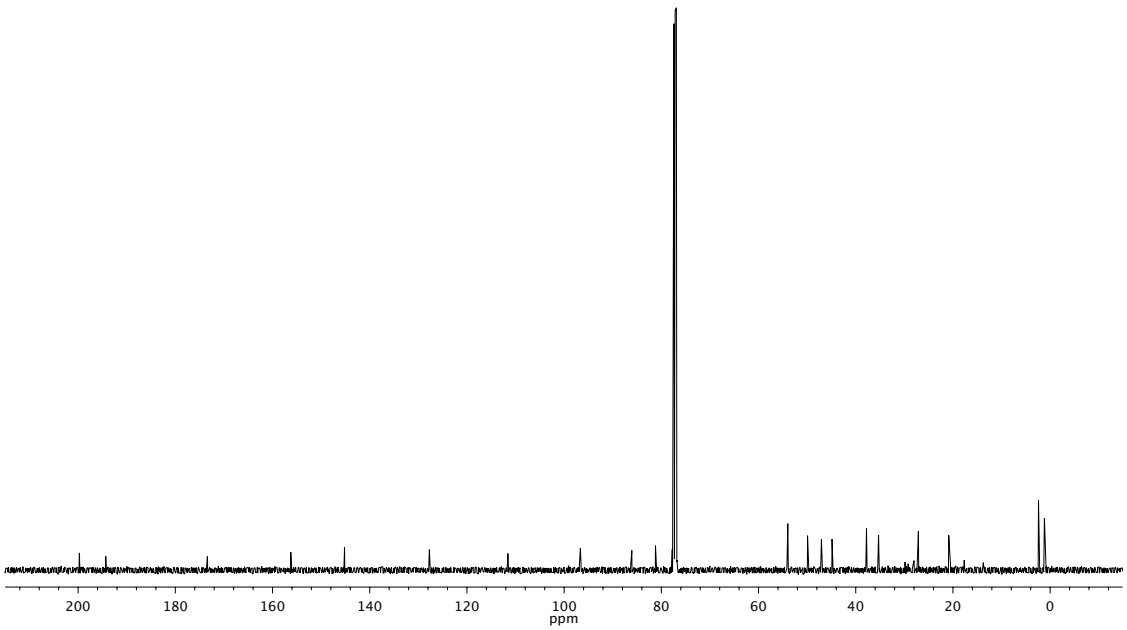
^{13}C NMR (101 MHz, $CDCl_3$) of compound **50**.



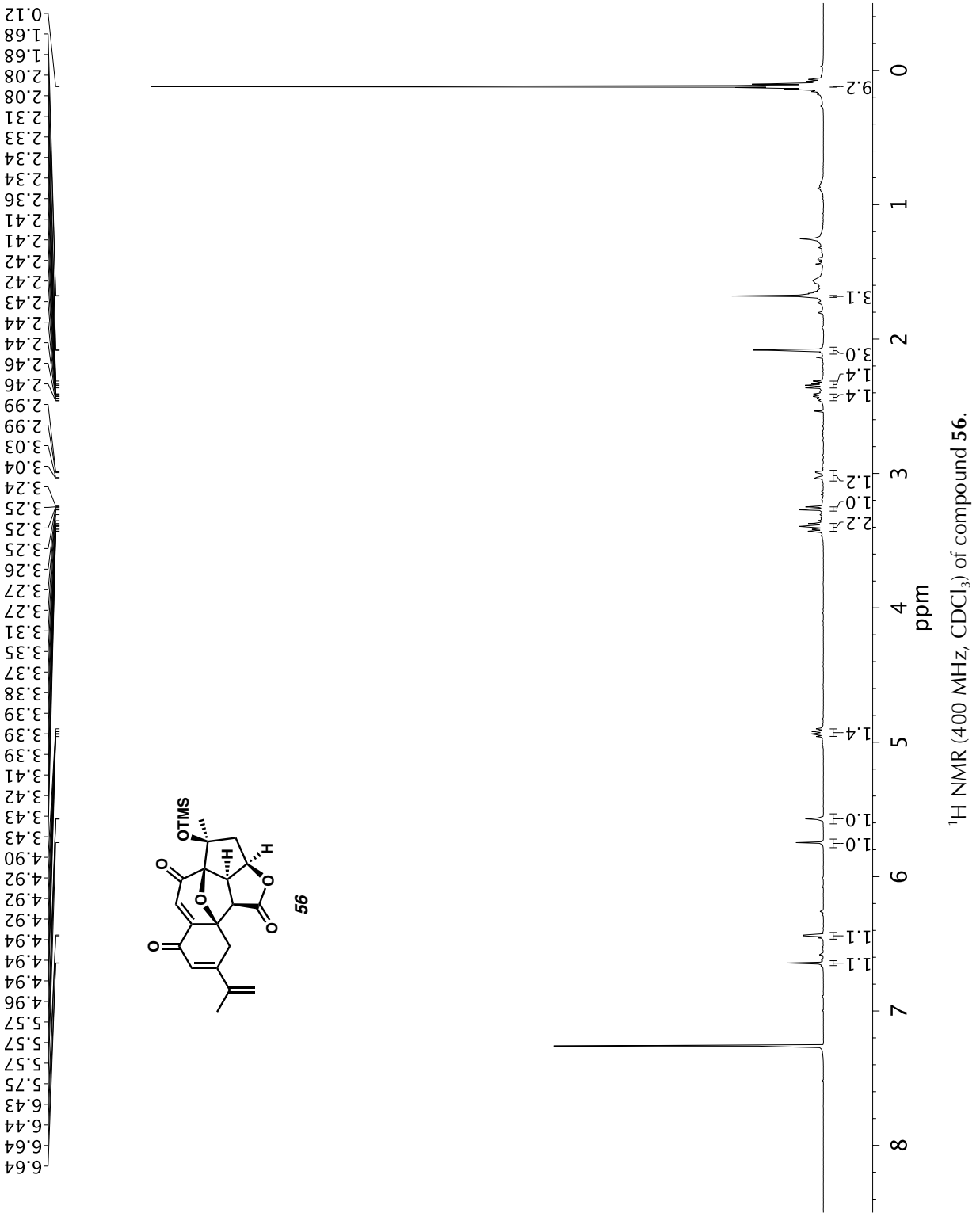
^{1}H NMR (600 MHz, $CDCl_3$) of compound **55**.



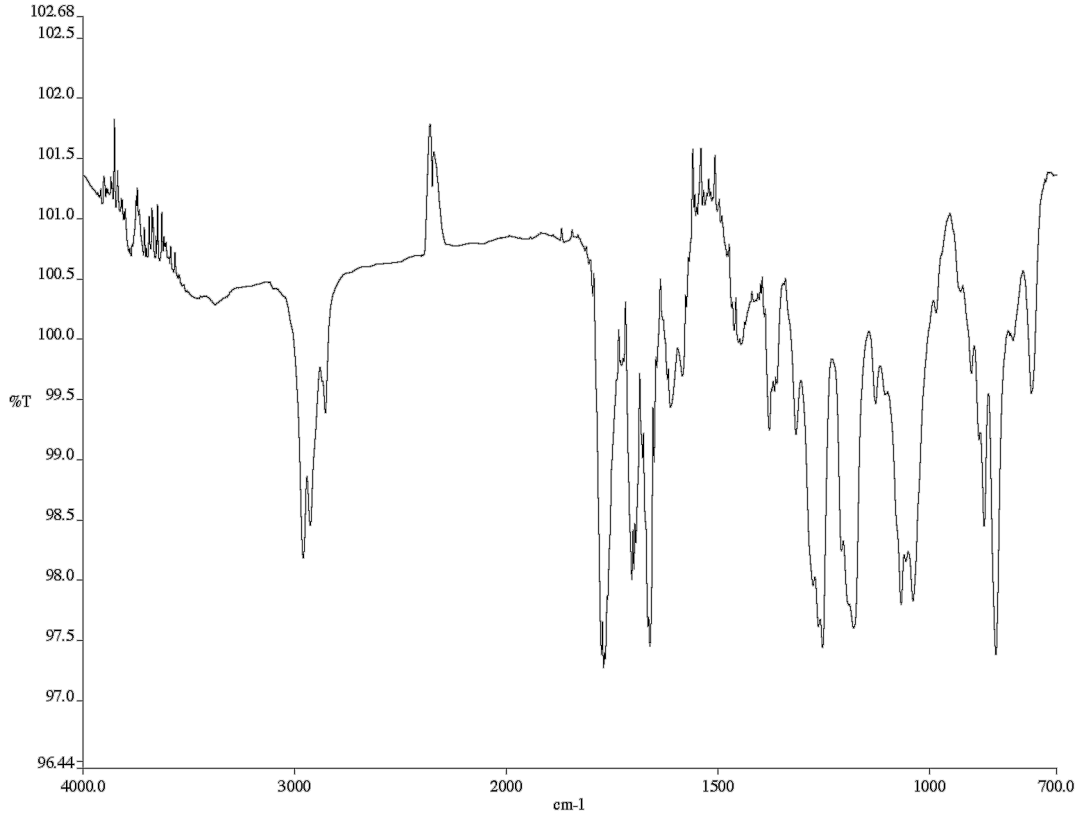
Infrared spectrum (Thin Film, NaCl) of compound **55**.



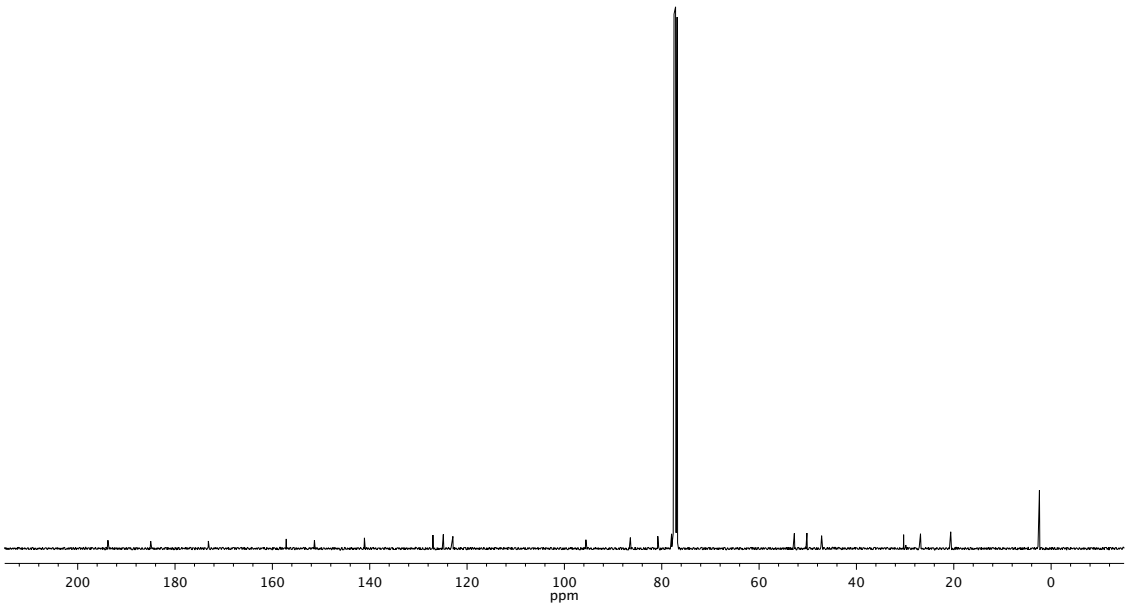
^{13}C NMR (126 MHz, $CDCl_3$) of compound **55**.



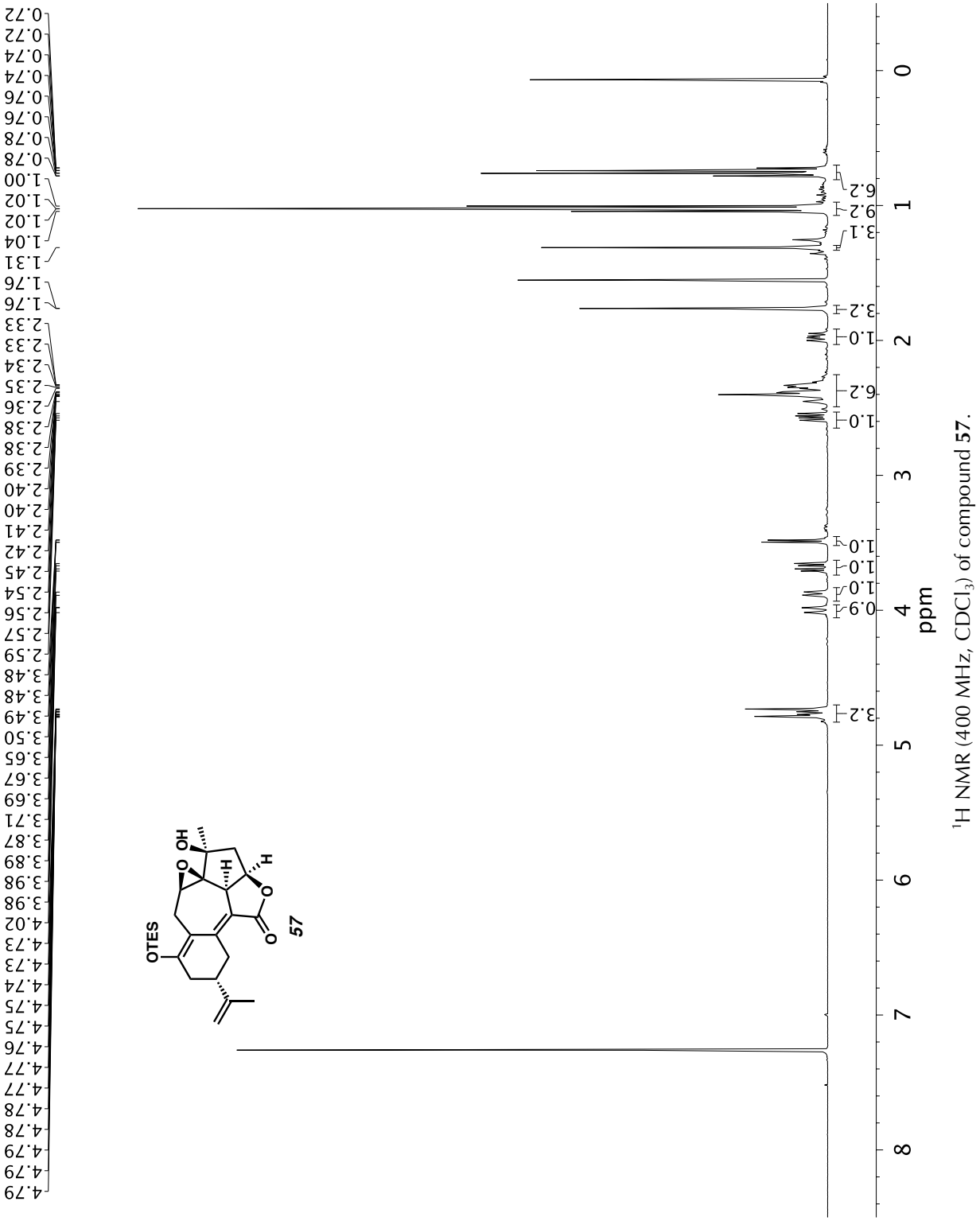
^{1}H NMR (400 MHz, $CDCl_3$) of compound **56**.



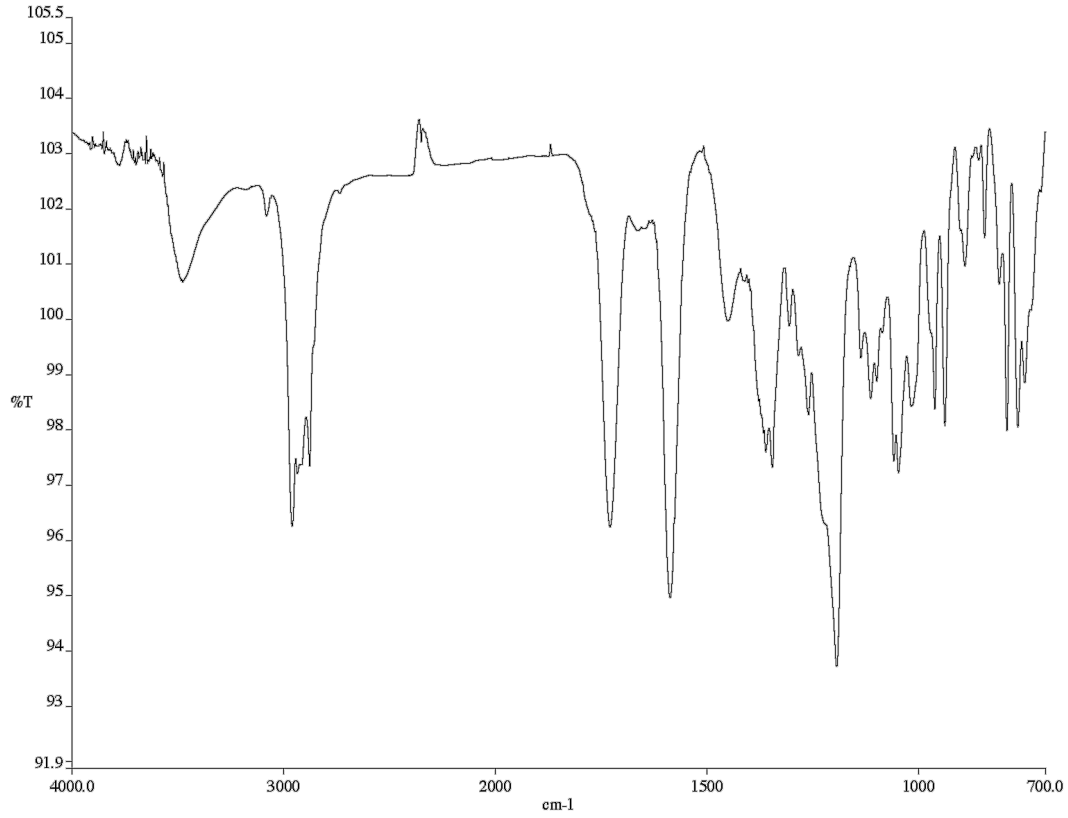
Infrared spectrum (Thin Film, NaCl) of compound **56**.



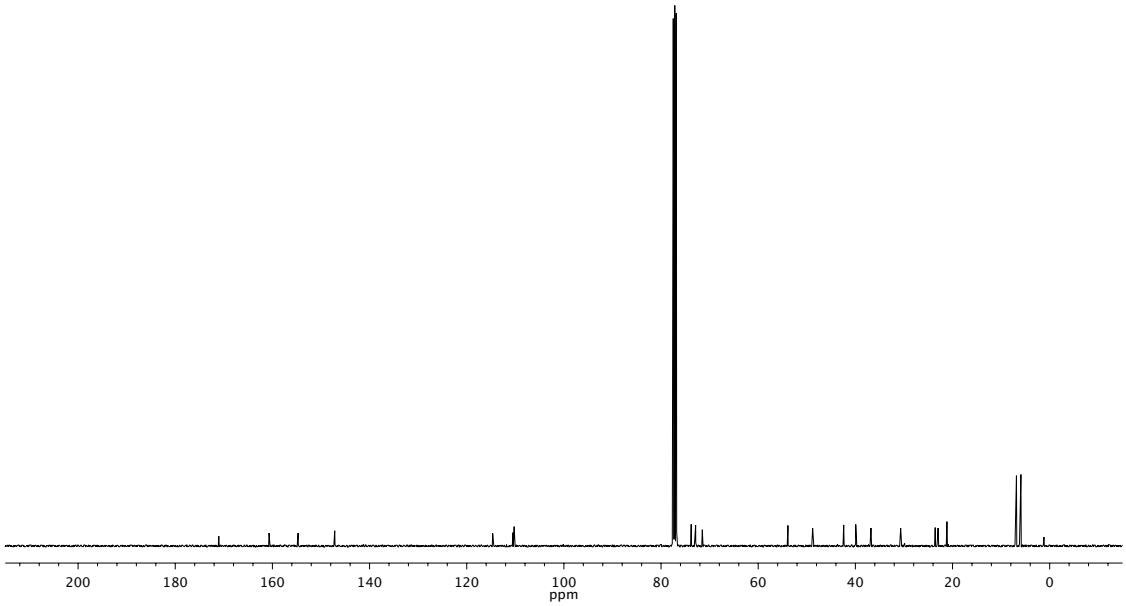
^{13}C NMR (101 MHz, $CDCl_3$) of compound **56**.



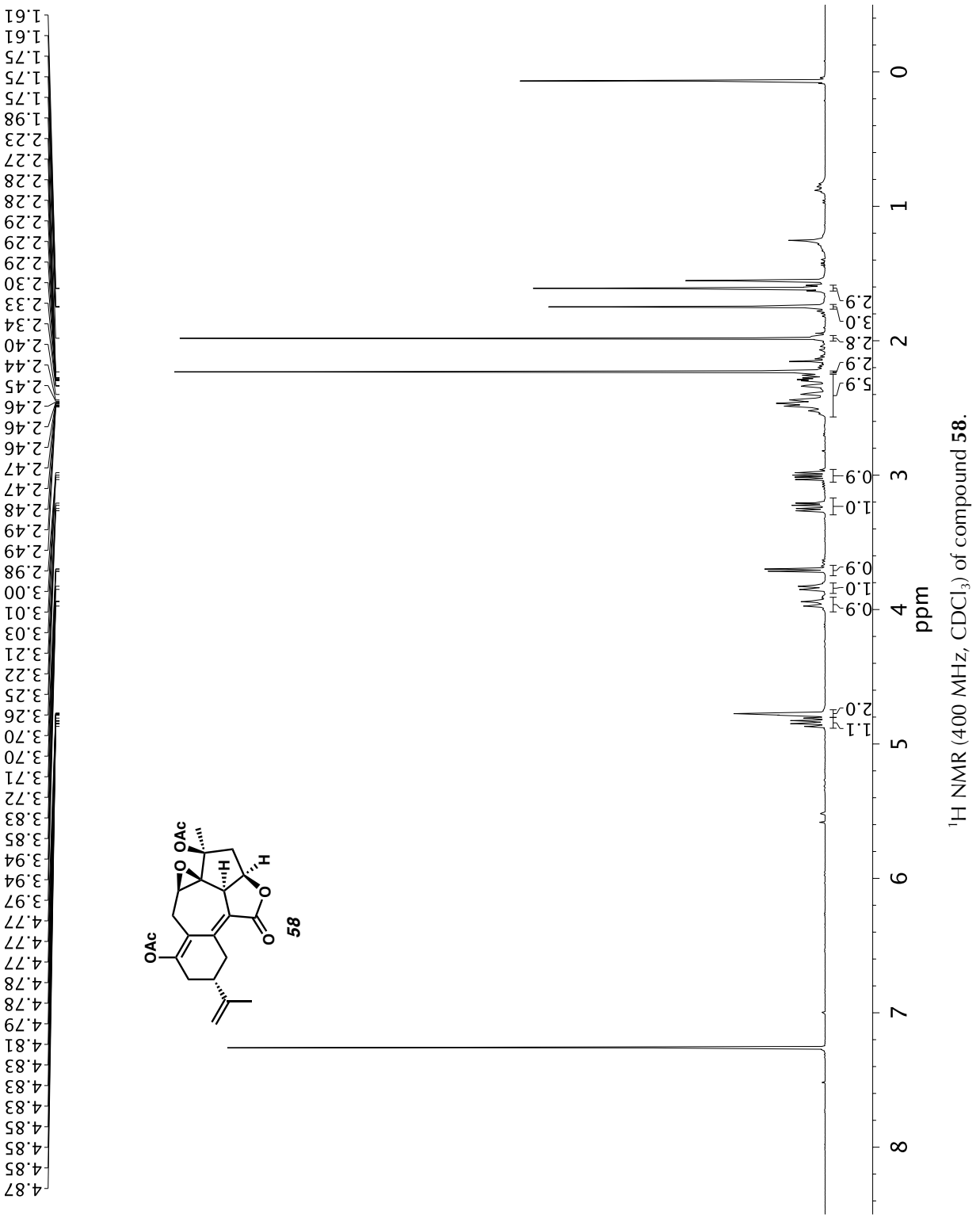
^{1}H NMR (400 MHz, $CDCl_3$) of compound **57**.



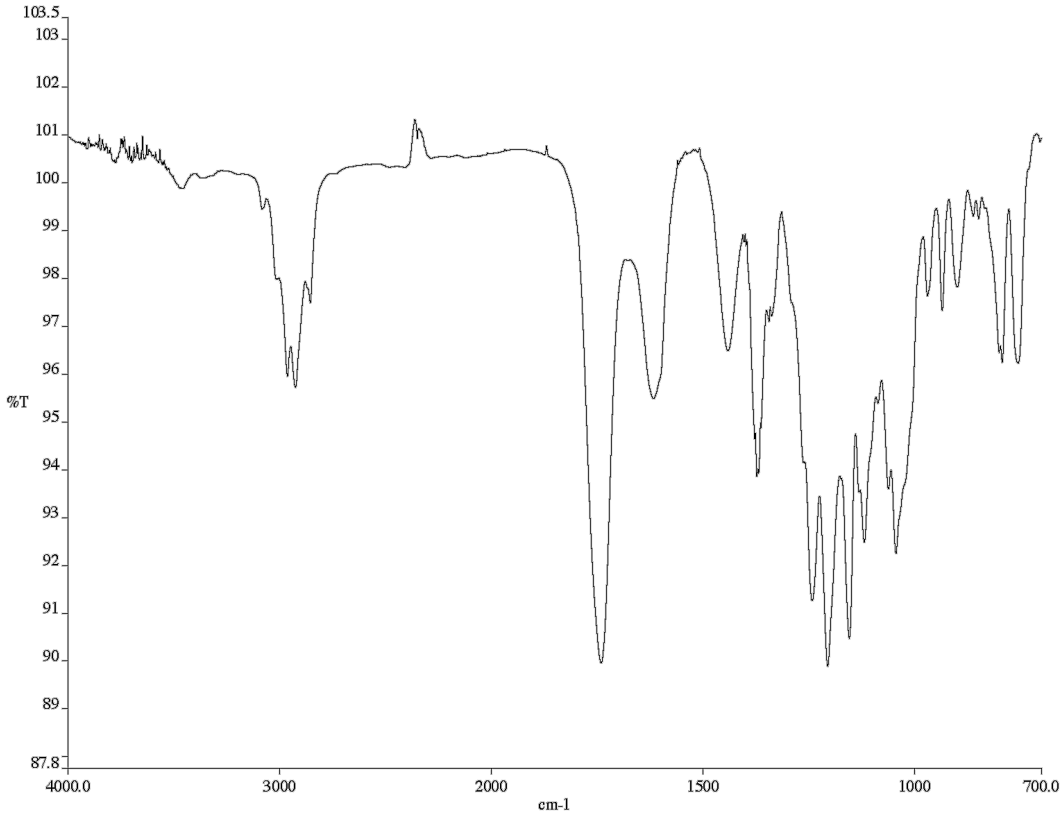
Infrared spectrum (Thin Film, NaCl) of compound **57**.



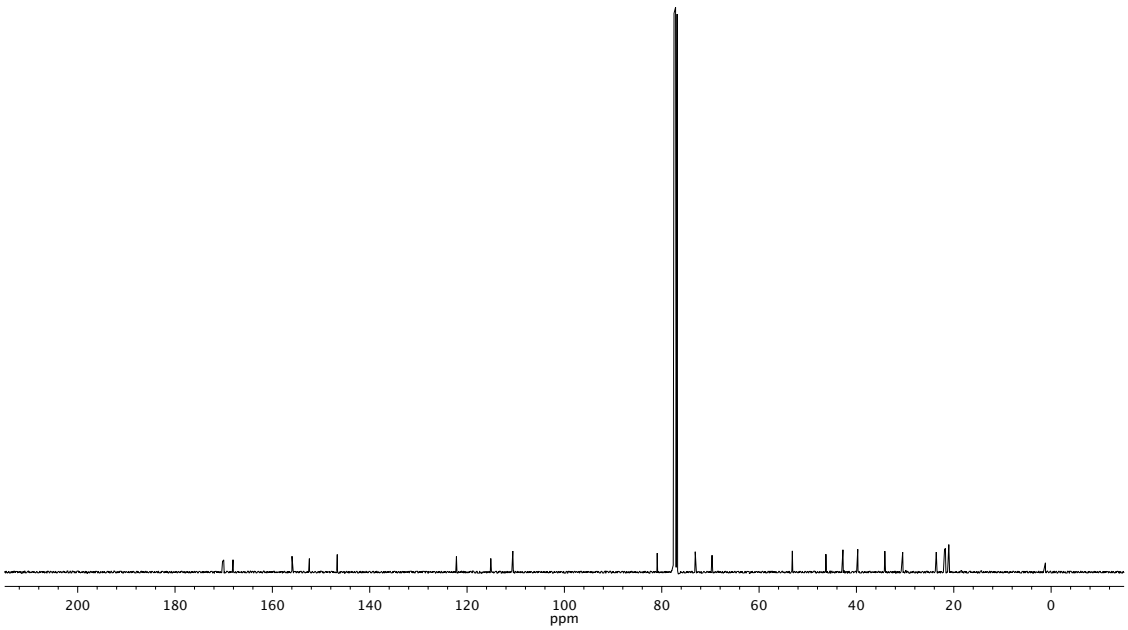
^{13}C NMR (101 MHz, $CDCl_3$) of compound **57**.



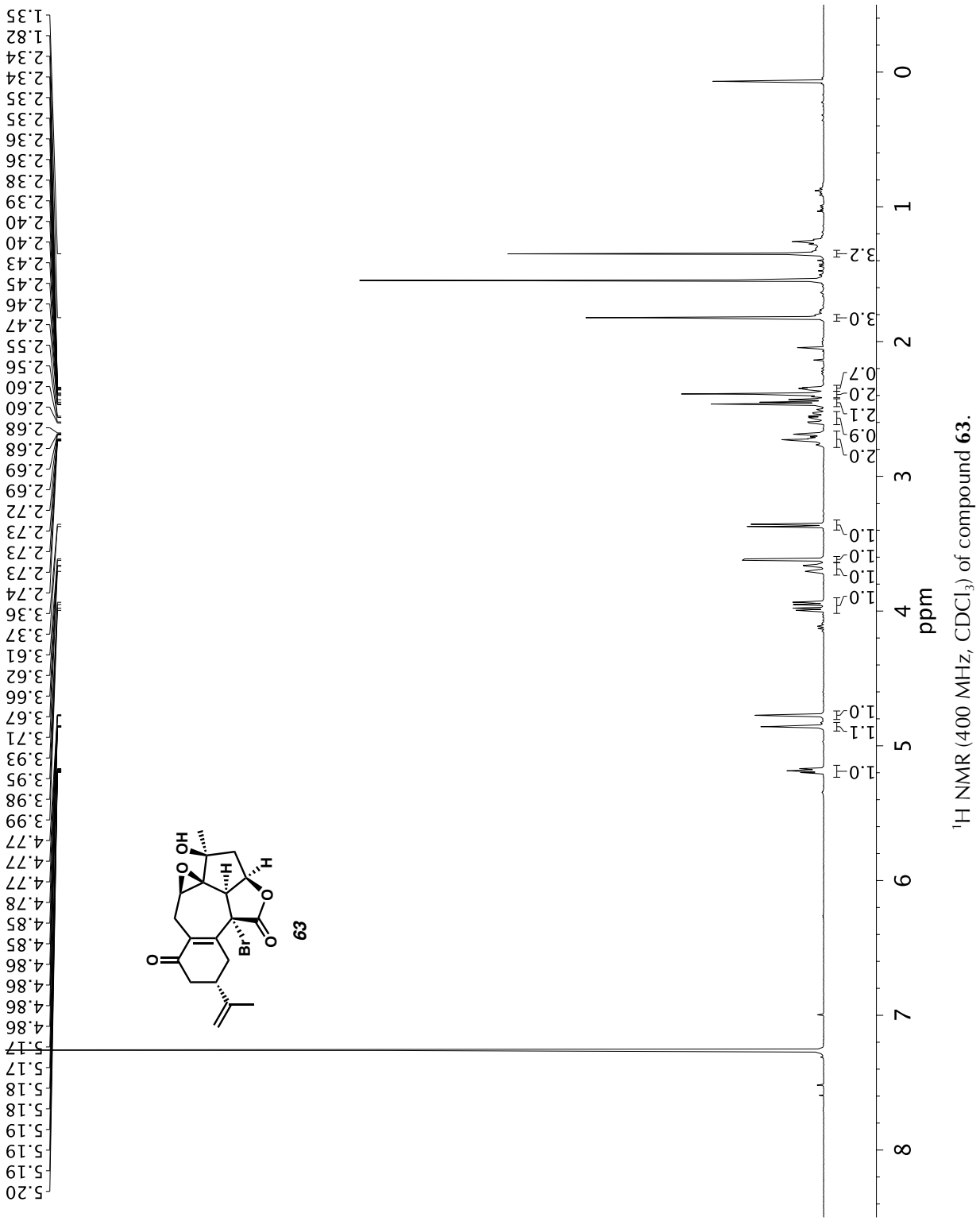
^{1}H NMR (400 MHz, $CDCl_3$) of compound **58**.



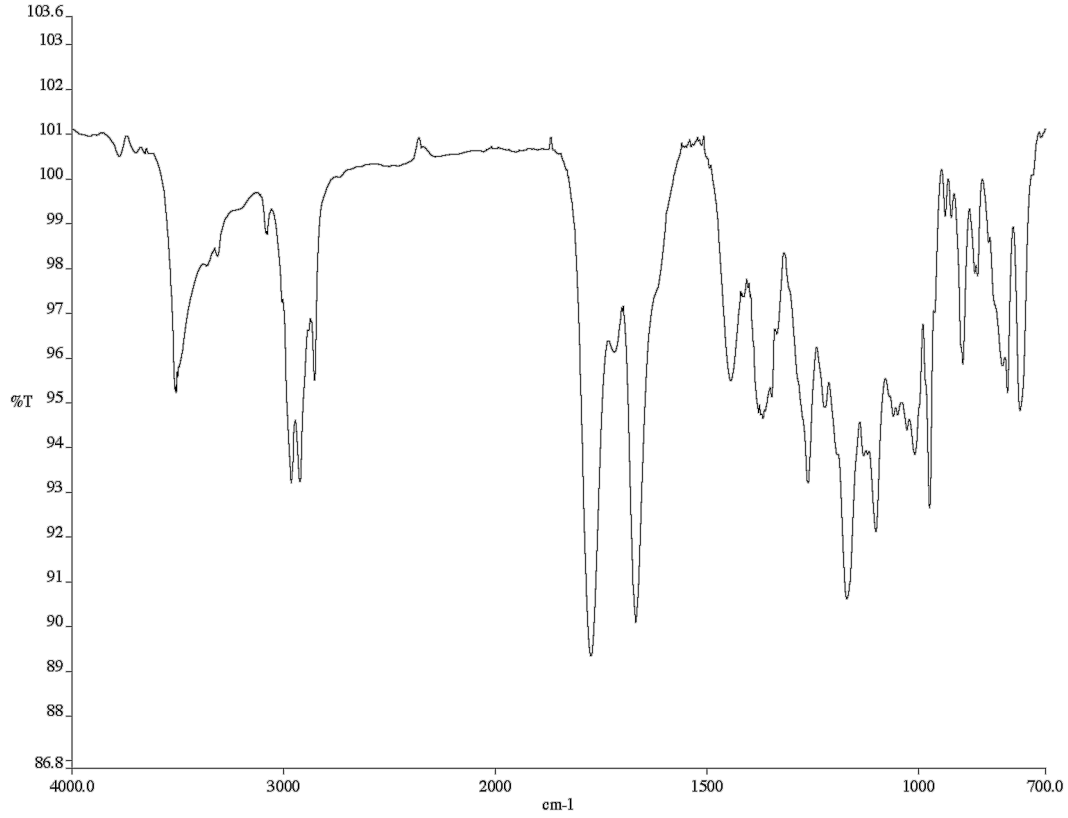
Infrared spectrum (Thin Film, NaCl) of compound **58**.



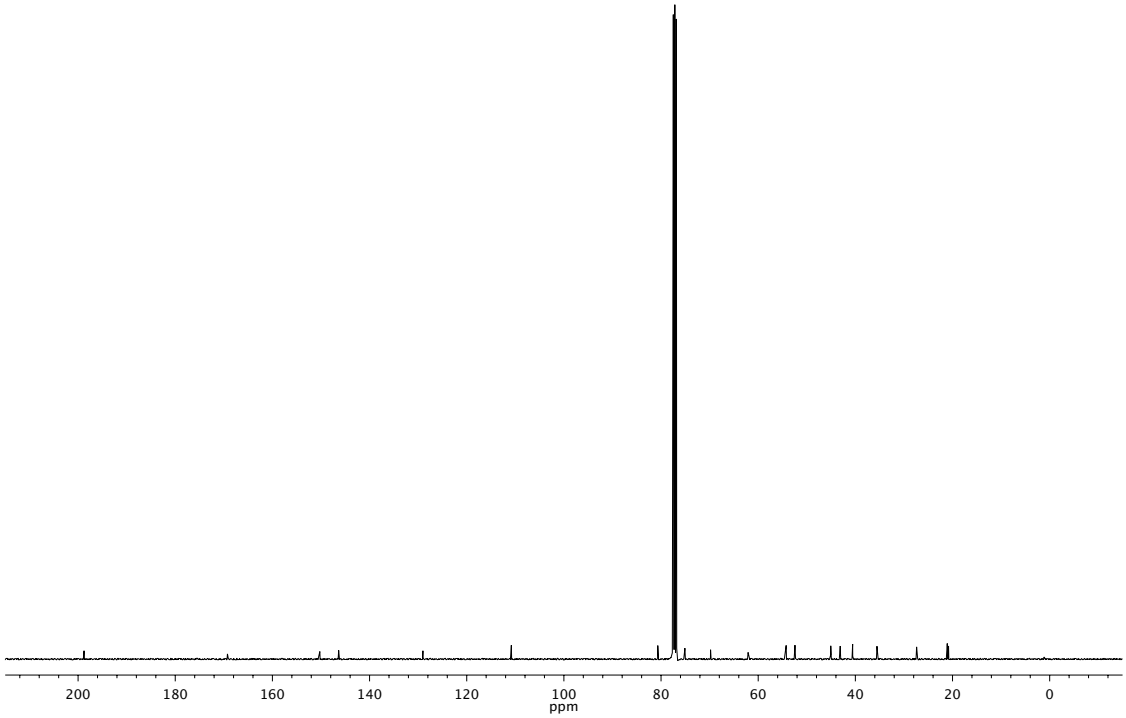
^{13}C NMR (101 MHz, $CDCl_3$) of compound **58**.



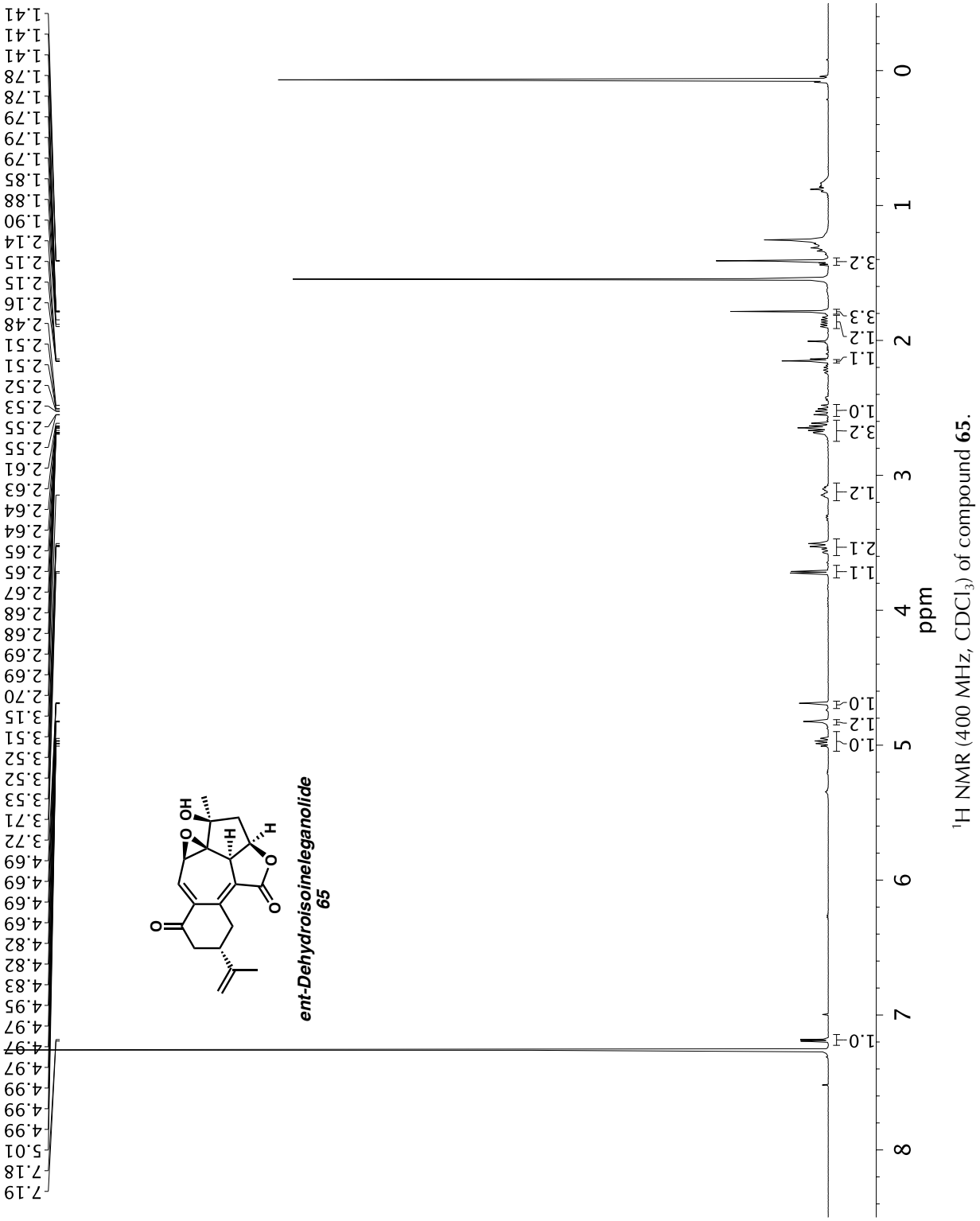
^{1}H NMR (400 MHz, $CDCl_3$) of compound **63**.



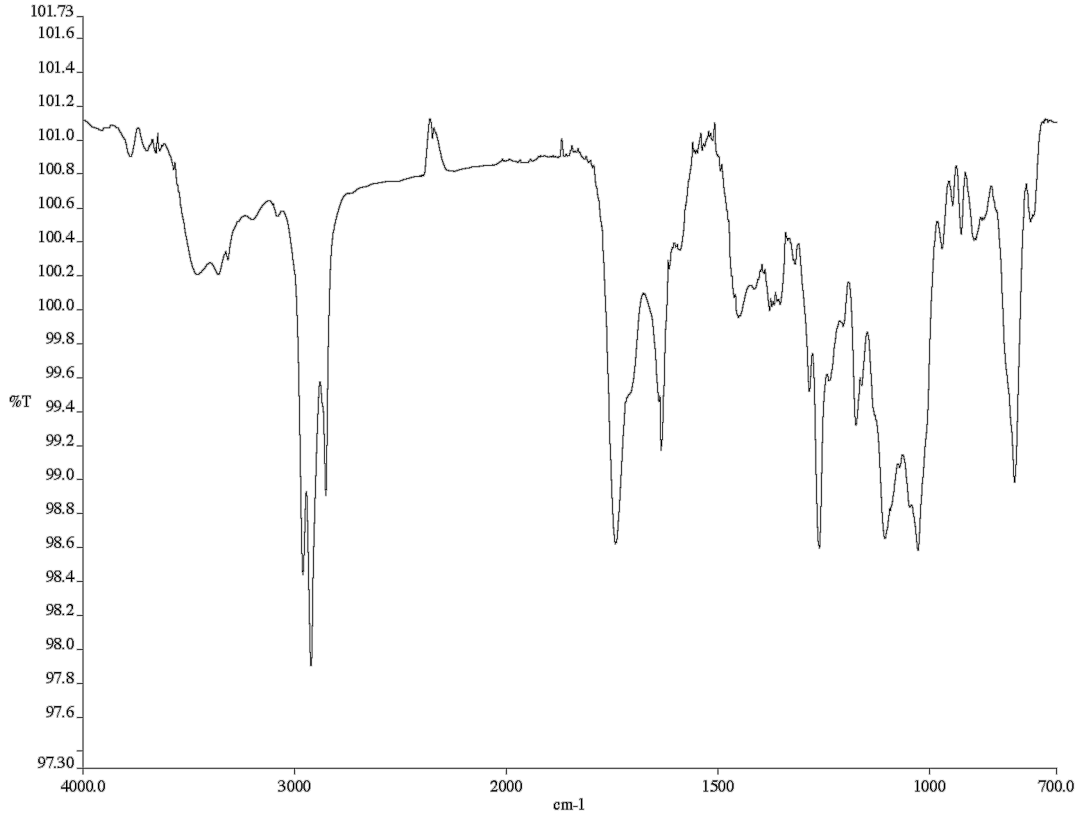
Infrared spectrum (Thin Film, NaCl) of compound **63**.



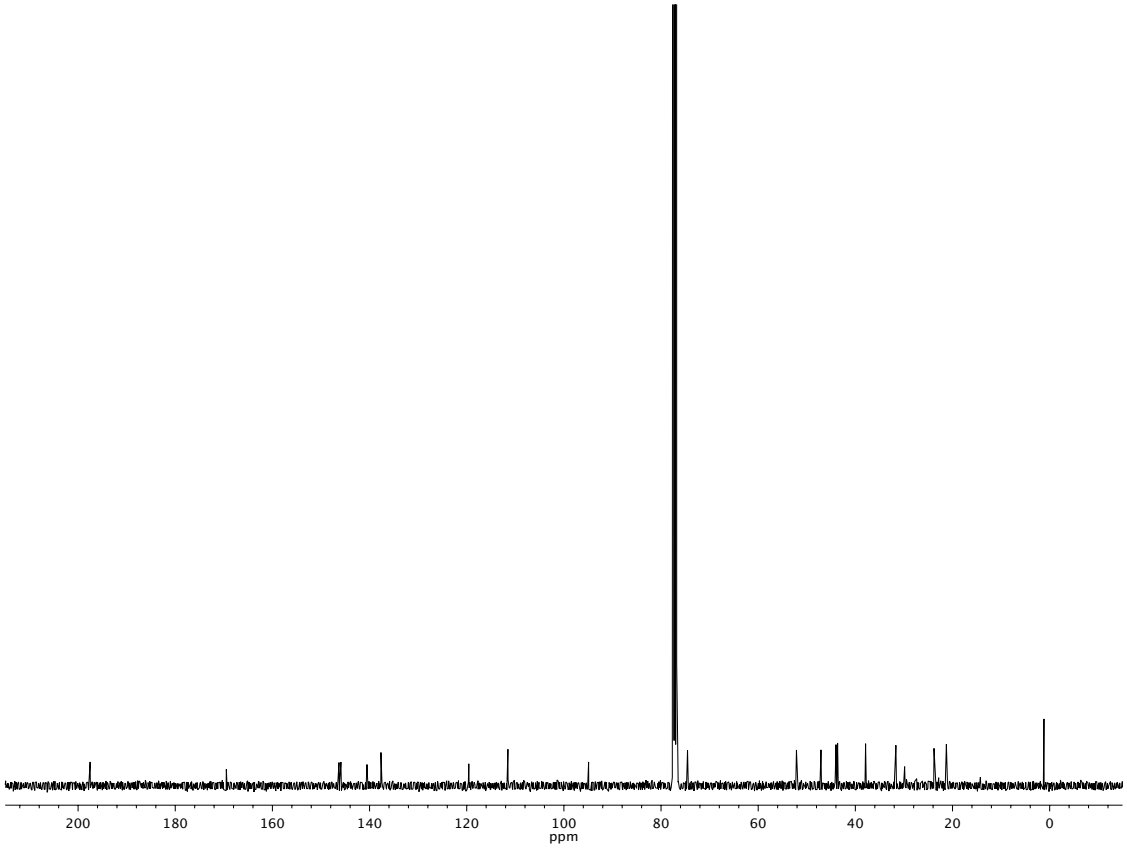
^{13}C NMR (101 MHz, $CDCl_3$) of compound **63**.



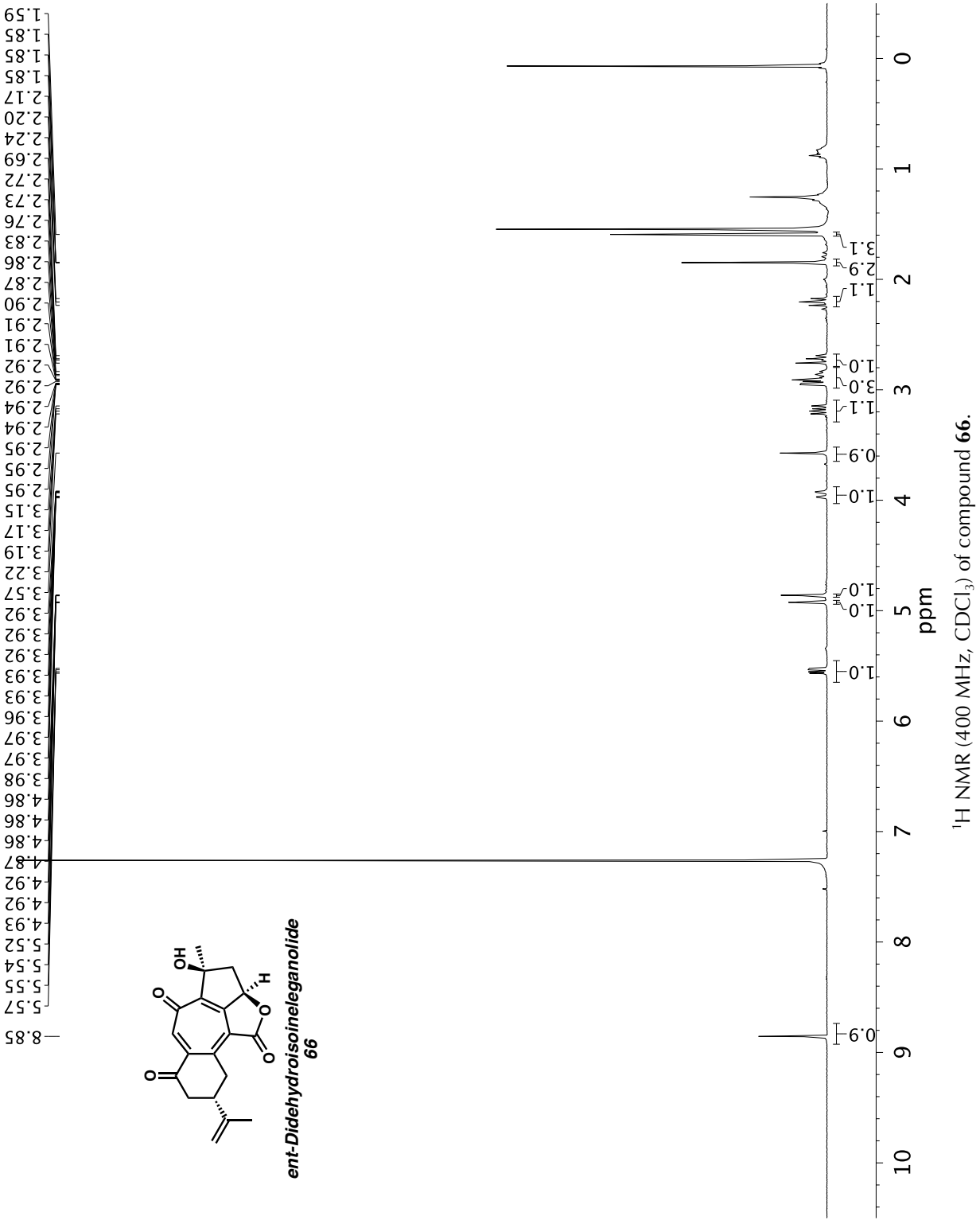
^{1}H NMR (400 MHz, $CDCl_3$) of compound **65**.



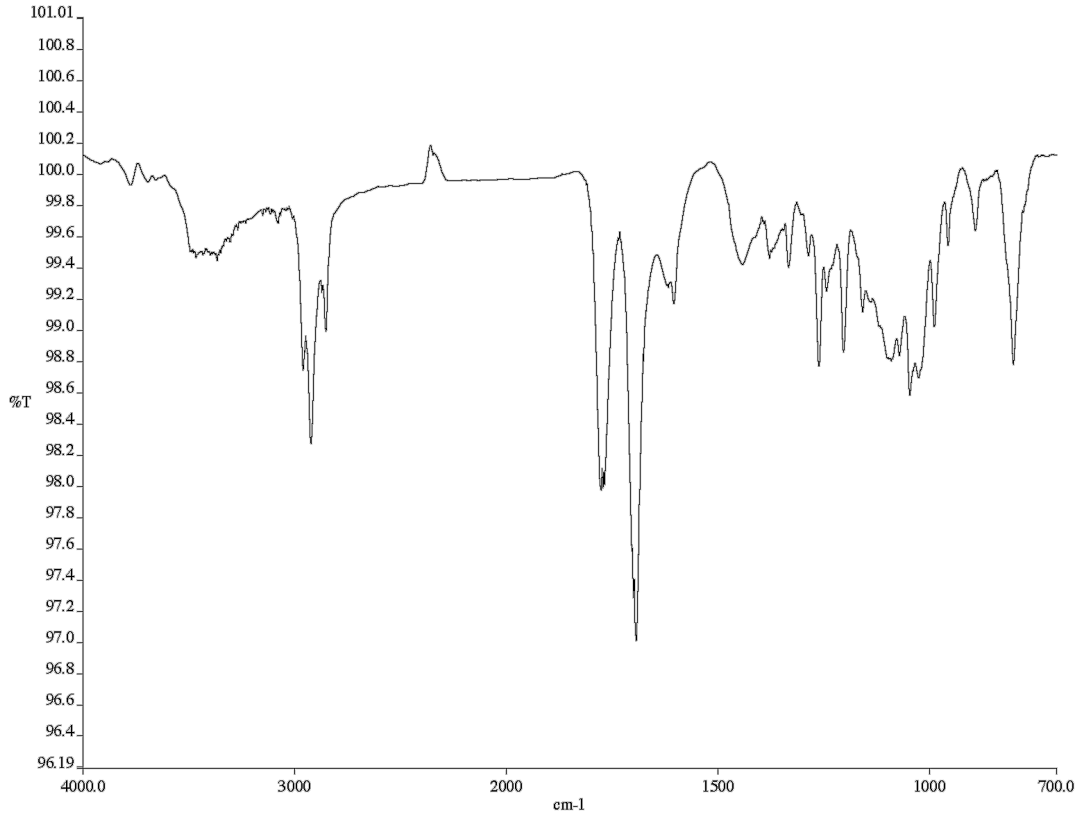
Infrared spectrum (Thin Film, NaCl) of compound **65**.



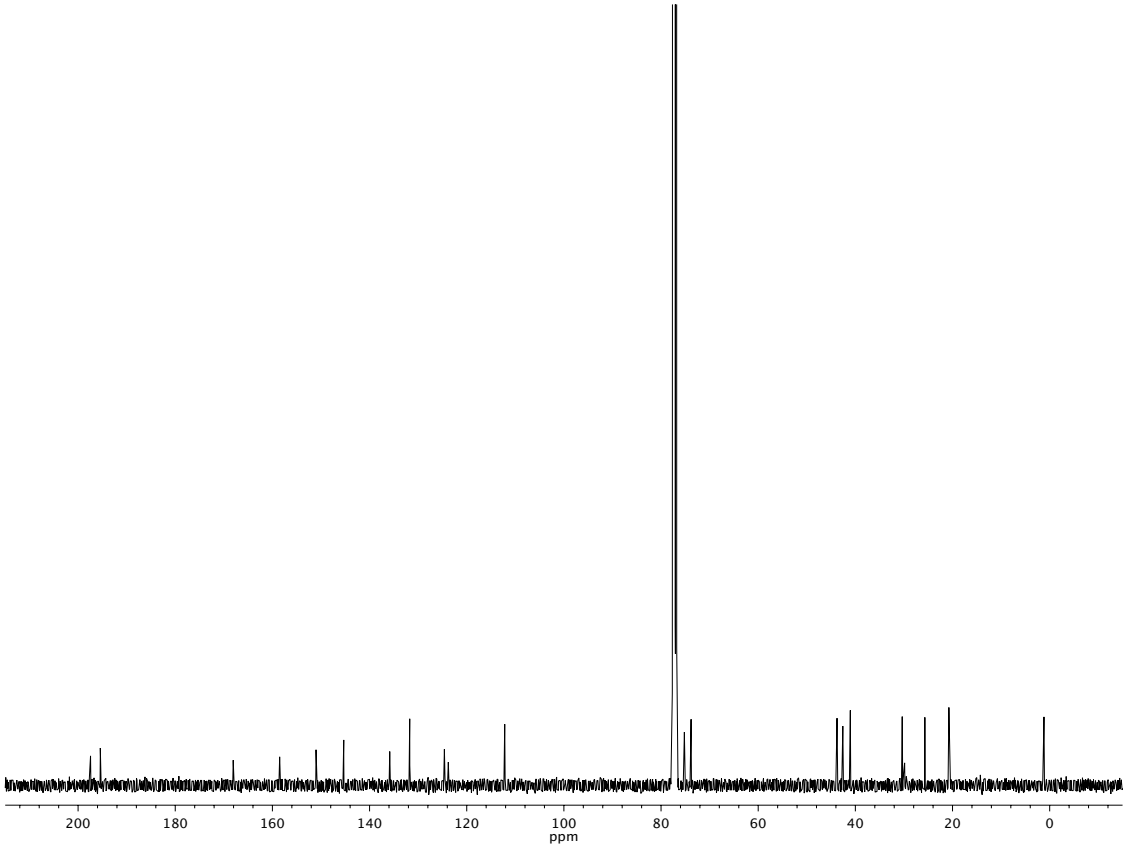
^{13}C NMR (101 MHz, $CDCl_3$) of compound **65**.



^{1}H NMR (400 MHz, $CDCl_3$) of compound **66**.



Infrared spectrum (Thin Film, NaCl) of compound **66**.



^{13}C NMR (101 MHz, $CDCl_3$) of compound **66**.